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"Sleepy Sickness" and Bearing Trouble In Ewes

Prevention By Suitable Methods Of Management

A. D. M. G. LAING, Veterinarian, Hastings.

SLEEPY Sickness (*ante-partum paralysis*) and bearing trouble in the ewe together account for a very large proportion of the mortality and indirect loss in ewes at lambing time. In certain districts, for instance, the average incidence of "bearings" during last spring was 4 per cent., of which about half either succumbed or had dead lambs.

As both these troubles are due to causes connected with nutrition it will be profitable to discuss briefly certain aspects of the treatment of the pregnant ewe.

The essential factor to be borne in mind in the management of in-lamb ewes is that just as milking cows require so much feed for the maintenance of their bodily requirements and so much more for milk production, so does the pregnant ewe require so much to keep herself and so much more to develop the one, two, or three lambs she is carrying. The important point here, however, is that these do not require nourishment in an evenly increasing ratio. Their needs are comparatively small during the earlier part of pregnancy **and disproportionately heavy towards the end.**

Between them, ante-partum paralysis (sleepy sickness) and "bearing trouble" cause much the greater part of the annual ewe mortality. Precautionary measures which may be taken are clearly discussed by the author, who emphasises that both troubles are caused by faulty nutrition and are preventible by suitable methods of management.

Investigations have proved that most of the foetal growth takes place during the last third of the period of pregnancy. In the case of the ewe, it may in fact be stated that during the last five weeks of pregnancy she is called upon to provide half the total growth requirements of the lamb or lambs she is carrying.

It is obvious, therefore, that special care should be taken to provide nourishing feed during the month prior to lambing. These points having been discussed the two conditions may be considered separately.

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Ante-Partum Paralysis

The more correct name for ante-partum paralysis, or sleepy sickness, is pregnancy toxaemia (toxaemia meaning poisoning). It is also sometimes known as twin lamb disease, from the fact that 95 per cent. of cases are found to be carrying two or more lambs. Its incidence is world-wide, and in New Zealand the losses in most seasons are appreciable and, in some years, serious. It appears to be associated with a feed shortage occurring during the latter part of pregnancy

In order to give a clear picture it is necessary to give a very sketchy description of the extremely complicated process by which the sheep converts pasture into flesh and blood, etc. A balanced proportion of the three main food factors, proteins, fats, and carbohydrates, is required. These are all broken down by the digestive juices and action of the liver into simple substances, waste products being excreted.

These simple substances are carried by the blood fluid to the muscles and there "burnt up" with the oxygen absorbed from the lungs, the resulting heat being the energy by which the body lives. A number of minerals, phosphorus, calcium, iodine, etc., are also essential to life and to the satisfactory working of the processes outlined above. It must be emphasised that the liver plays a very essential part.

When food intake is in excess of bodily requirements the surplus is stored as fat. If the daily food is insufficient, then the fat reserves are called into use. The liver is the organ by means of which the body reserves of fat are converted into the simpler substances, in which forms alone they can be made use of to support life. In the pregnant ewe the position is further complicated by the heavy requirements of the foetus during the last month of pregnancy, and the several factors result in inefficient functioning of the liver, the formation of injurious substances in it, and the setting up of a condition of toxaemia or poisoning.

Symptoms

The symptoms occur at 10 to 20 days before lambing is due. The ewe is dull, off feed, and keeps separate from the flock. The earliest noticeable sign is frequently a loss of control over the limbs. When driven, the ewe will trip up or cross her forelegs. Later, she will stand stupidly and be moved only with difficulty. The eyes appear glazed and sightless. She may stagger or walk in circles.

As the condition gets worse the ewe lies down, collapsing again after walking a few paces if raised to her feet. She may live for several days in this condition, death occurring in a few days from when the earliest symptoms supervened.

Appearance of Organs After Death

The general condition of the organs after death is good. Healthy twin lambs are found in the womb. The liver, however, is quite abormal, being enlarged, pale, yellow, very easily broken, and greasy. Some of the internal fat may have a patchy, parboiled appearance.

Treatment

Nothing can be done once the case is far advanced, because the liver has become completely useless. In the early stages, however, while there is a desire for food and the ewe can move about, dosing with one to two ounces of Epsom salts and ½lb of molasses, repeating the molasses (but **not** the salts) daily, gives a good chance of a cure. If the ewe lambs the symptoms will disappear. It is essential that ewes under treatment be put on succulent feed, such as young grass, green barley, etc.

Treatment of Affected Flock

Every effort should be made to supplement the feed. Good quality hay, preferably legume, and succulent green feed, such as young grass, barley, etc., should be made available if possible. In cases in which the flock is in high condition daily exercise appears to be of considerable value, both in itself and as a means of picking out affected ewes in the earliest stages (tripping up when driven) for special treatment. A good plan is to muster the affected mob daily and drive them slowly for half a mile to a mile to good pasture and back again after one or two hours.

Prevention

No deficiency of calcium or other mineral has been diagnosed in this

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condition. A calcium deficiency does occur in lambing sickness, which is a different disease. Prevention, therefore, is on common-sense lines, having regard to the facts mentioned above:—

(1) Ewes should be in good condition, but not fat at tupping time.
(2) If any shortage of feed is anticipated it is better, as far as is practically possible, that it should occur during the earlier rather than the latter part of pregnancy (note the disproportionate foetal requirements during the last month).
(3) The ideal is that ewes should rise slowly in condition from tupping to lambing, farm management being directed to that end. Such a policy will ensure a minimum of casualties and a maximum milk supply for the lamb.
(4) Where paddocks are not top-dressed a lick composed of equal parts of bone meal or bone flour and salt should be made available.
(5) To enable the above policy to be carried out it is essential that reserves of winter feed be carried from year to year to offset uneven pasture growth in certain years and seasons.

Bearing Trouble in Ewes

The more correct name for bearing trouble in ewes is eversion of the vagina. The term "red bag" is frequently used, arising from the appearance of the everted membrane.

It is of interest to note that this condition can occur in any of the domestic animals, and does do so to a rare extent everywhere, both shortly before and shortly after parturition.

The epidemic form occurring some days before lambing, however, which is met with in New Zealand, is seen in seasons which favour its development. The trouble appears to have come to notice fairly early in the history of New Zealand farming, but it was only about 1890 and in the early years of this century that it became widespread. While a small proportion of cases occur in dry ewes in poor condition, in the great majority the ewe is pregnant and in good order.

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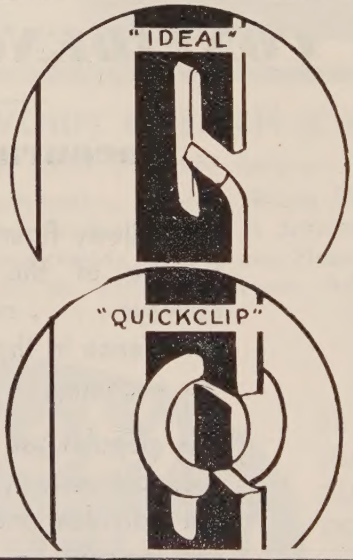

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Symptoms

Symptoms occur about seven days, although often longer, before the ewe is due to lamb. The protrusion of the membrane lining the vaginal passage from the vaginal orifice in the form of a large, reddish swelling is the first sign noticed. The ewe is listless and uneasy, grazes little, and tends to separate herself from the flock.

The swelling increases with time, both from straining on the part of the ewe and from the accumulation of blood in the extruded part. If it is not treated inflammation sets in, the ewe cannot make her water, and death ensues. Occasionally the "bearing" will return of its own accord, especially in those cases occurring in dry ewes.

The vast majority of affected ewes are 4-tooths and 6-tooths and upwards, and it is rare in 2-tooth ewes.

Appearance of Organs After Death

There is usually much abdominal fat present in the organs after death. The liver is pale and greasy. In 90 per cent. of cases twin lambs are being carried. The bladder is enormously distended with urine.

Cause

This condition is due to incorrect nutrition. The immediate chain of circumstances is:—

(1) The ewe nas been carrying too much condition.
(2) The flock is rarely disturbed and feed is plentiful, but inclined to be rank.
(3) The ewe lies down to ruminate for long periods, during which the bladder fills up.
(4) She gets up to urinate only when tne bladder is full. It may be noted how invariably such sheep, when disturbed, immediately make water.
(5) In all animals, when the bladder is excessively full, a nervous contraction of the neck will take place, preventing the act of urination for a few seconds.
(6) The ewe then strains to bring about urination. Straining consists of a contraction of the muscles lining the abdomen, etc.
(7) This contraction forces the organs backwards into the pelvis.
(8) The paunch is full, feed being plentiful, and the womb is gravid, usually containing two foeti. Much abdominal fat is present. All these factors increase the pressure mentioned below.
(9) The neck of the bladder is pressed against the aitch bone, it being so situated, by the abdominal organs coming backwards from the straining.
(10) Should the ewe attempt to make water when lying down, the tendency to close the bladder is still greater.
(11) The ewe is now in a "vicious circle," the more she strains to urinate the more effectively is the neck of the bladder closed and the longer the bladder is closed the greater is the straining to make water.
(12) Eventually the vaginal lining is forced out to the exterior—"bearing" out.

Treatment

If the ewe can be treated before the extruded membrane has become congested, injured, or filthy a good percentage of cures can be obtained. The not uncommon cases of relapse after lambing should be watched for and treated on the same lines.

The part should be gently cleansed. Condy's crystals at a half-teaspoonful to a gallon of water, freshly prepared daily, are good. Lysol at a strength of one tablespoon to the gallon is sound. Strong or irritant antiseptics must be avoided, as they cause straining.

Having ensured that the hand and forearm are clean and the nails short and even, they should be smeared with carbolised oil and the vaginal membrane returned into place, keeping it in position with the hand until it is warm and the blood has begun to circulate.

If desired, the administration by the mouth of one drachm of chloral hydrate (this can most easily be given in a small-size gelatine capsule) will help

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to prevent the ewe straining and forcing the bearing out again. Raising the hindquarters during the above operation, if this is possible, will materially assist. When the operation is completed two or three locks of wool should be tied across the vulva to help to retain the membrane in place. Stitching, safety pins, and other materials to pin the lips of the vagina together are best reserved for chronic cases of relapse of the trouble.

An old crude but effective method in the early stages was to secure the ewe to a wire fence for a few hours, so that the hindquarters were well off the ground, care being taken that there was no risk of suffocation from pressure of the paunch on the chest. The womb slips forward, the ewe makes water, and when the animal is liberated the bearing remains in.

On no account should materials such as bran, short wooden sticks, etc., be placed in the vagina to retain the bearing mechanically. Such remedies may seriously injure the ewe and are, in any case, of little value for the purpose for which they are being used.

Prevention

It is determined that outbreaks of this trouble occur after a mild winter, when food has been plentiful and the pastures rank in growth, and when the ewe flock as a whole has been in too high condition.

For example, in 1908 and again in 1938 in Hawke's Bay the rainfall from January onwards was far in excess of the average and the seasons very mild, with resulting tremendous growth of pasture. In both these years the incidence of "bearings" was very much higher than usual, while, in between, those seasons in which there has been a high incidence of bearings have shown similar climatic and general conditions on a somewhat milder scale.

Prevention is on common-sense lines, that is, as mentioned earlier in this article—ewes to be in good condition, but not fat at tupping time, and to have sufficient feed to keep them rising slowly in condition throughout pregnancy, allowance being made for the disproportionately large requirements of the foetus during the last month.

Where feed is plentiful and the ewe flock appears lazy, if the ewes are mustered **quietly** once daily and given a change of pasture and gentle exercise for one to two hours, this trouble will be largely prevented.

General

The following quotation from a standard text-book in regard to this condition (eversion of the vagina) in the cow may be of interest.

"This accident may occur in well-shaped cows whose tissues, and especially those of the genital organs, are soft and relaxed—animals of a lymphatic temperament, with a wide pelvis, and which are fed on an abundance of bulky but not nutritious food."

It is certainly the short, blocky ewe with the wide pelvis which is the most liable to put out her bearing, and the parallel case in the cow is of considerable interest. In the cow it is rare also at first calving.

Inquiries were conducted in Hawke's Bay during 1938, and certain tests carried out confirmed the fact that nutritional causes are the main factor. There are, however, grounds for considering that conformation (see above) and heredity both may play a part. In regard to the heredity factor, no data are available.

Culling for "bearings" is unfortunately not practised in stud flocks. The ordinary flock ewe which has put out her "bearing" and recovered is usually marked for fattening, and no records are available as to whether the ewe lambs she has bred are more liable to put out their bearings when they become 4-tooth ewes than are ewe lambs from normal ewes.

It is hoped to test both these points by field experiments in Hawke's Bay during the coming seasons. The possibility of the condition being hereditary through the ram also requires to be eliminated by sound investigational methods. Here again no facts are available.

Summary

(1) Ante-partum paralysis and "bearings" between them cause much the greater part of the annual ewe mortality.

(2) Both are nutritional in causes and preventible by suitable methods of management.

(3) To overcome climatic variations, reserves of supplementary feed, hay, ensilage, etc., should always be available. The two former can, of course, last for years until required and need not be touched in good seasons.

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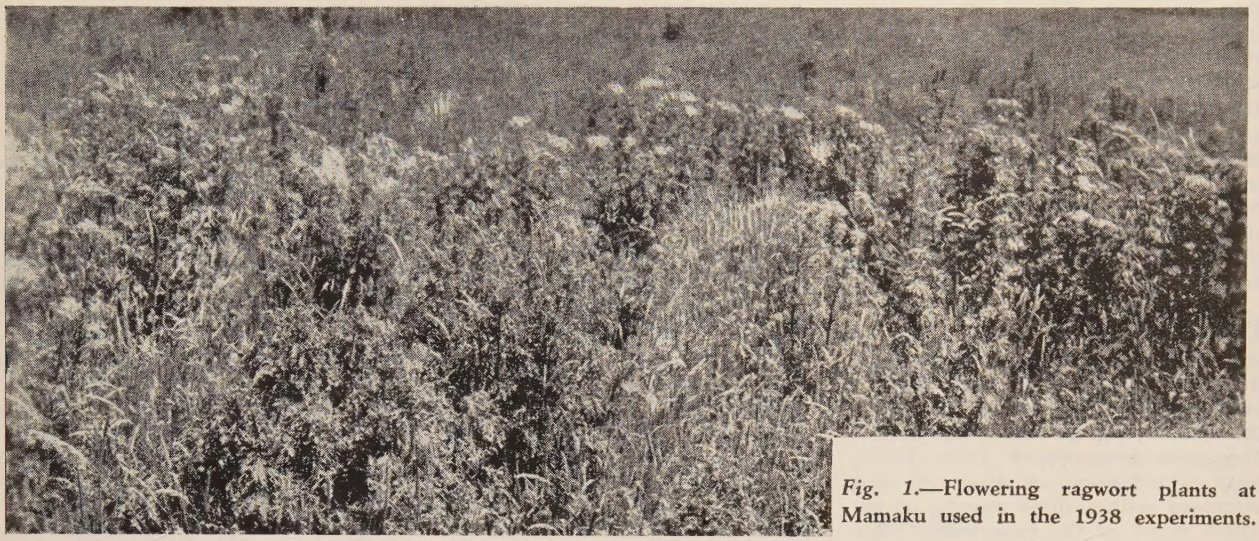


Fig. 1.—Flowering ragwort plants at Mamaku used in the 1938 experiments.

Control Of Ragwort By Pulling In The Flowering Stage

Extended Use Of Method Is Warranted Where Infestations Consist Of Only Scattered Plants

A. L. POOLE and D. CAIRNS, Botany Division, Plant Research Bureau.

WHEN the ragwort infestation on a farm is scattered, pulling of the odd plants is sometimes carried out in order to control infestation. This operation is usually left until the plants are in flower, as it is much more easily performed then than at the rosette stage.

The pulling of ragwort rosettes was tried, but this method proved quite impracticable and useless for control. Ragwort is normally in the rosette stage during the winter and spring months, when the soil is moist and heavy and the root system is tightly embedded in it. It was therefore found necessary to use a fork to loosen the plant, but this loosened much pasture at the same time and, on pulling, a big clump of pasture and earth came away with the plant. Moreover, it was impossible to lift all the roots, and those left in the ground quickly sent out new shoots.

Experiments have shown that the pulling of ragwort in the flowering stage can be expected to have at least a 55 to 65 per cent. control in the Waikato and adjacent districts. A much more extended use of such a method of control is therefore warranted where infestations consist of only scattered plants over a farm or along a roadside.

In the rosette stage the roots have much vigour, and are capable of sprouting in a short time. Thus, the bare patches quickly became a veritable carpet of ragwort shoots. On the other hand, when the plant is in flower the soil is usually more friable and the root system, or part of it, easier to extract. Further, the flowering stems offer a good means of grasping hold of the plant for pulling, and the roots left in the ground are not so prone to send out new shoots.

Loosening the Plants

Even in the flowering stage, however, large vigorously-growing plants still present a problem, as do plants growing in stiff soils which bake during the dry weather. It is best to loosen these plants with a fork before lifting, or to take advantage of the softening effect on the soil of a shower of rain.

To ascertain the actual effectiveness of this practice as a means of control, experiments were laid down at Ruakura and at Mamaku, near Rotorua, in the ragwort flowering season of 1937. The results of these experiments were published in the *Journal of Agricul-*

ture, February, 1938. A 50 per cent. (approx.) kill was obtained, and the other 50 per cent. of the plants sent up new shoots from roots which were left in the ground.

An experiment involving 160 plants was laid down at Mamaku in the flowering season of 1938 to test out these results on a larger scale. The results of this experiment, together with those of the previous season, are now given in detail.

1937 Experiments

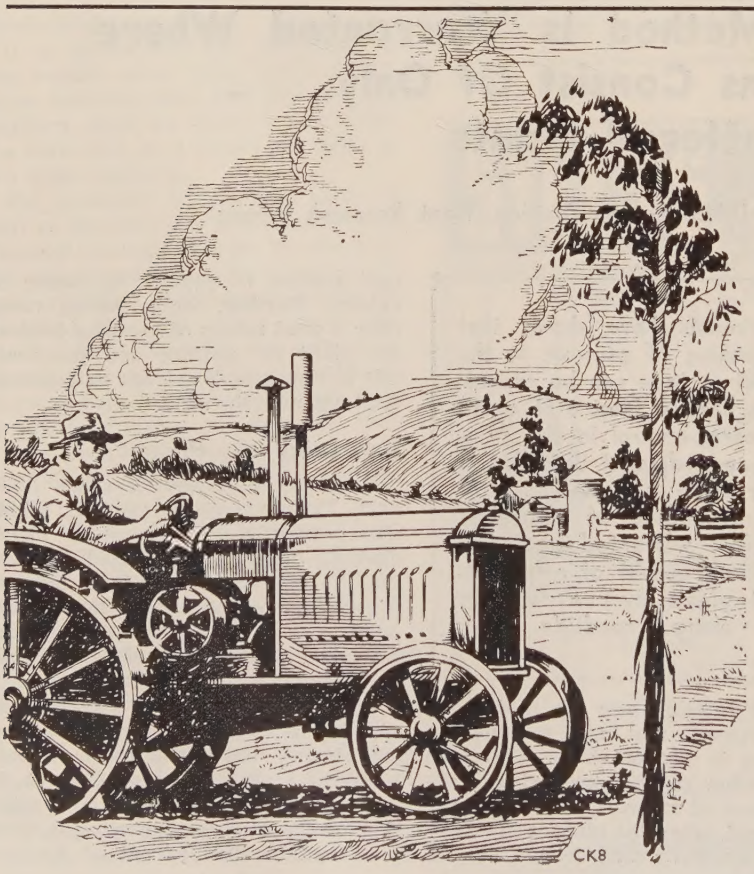
Of the two experiments in 1937, one was carried out on ten plants at Ruakura in a good, cow-grazed pasture of dominant rye grass and white clover. The areas from which these plants were pulled were all dug over and examined within three months of the laying down of the experiment. Six had young shoots from roots which had been left in the ground, but the remainder showed no sign of shoots or living roots.

The other experiment was laid down at Mamaku, where 30 plants in a dense pasture of browntop, danthonia and weeds were used. The positions of the pulled plants were all dug and examined within six months of the laying down of the experiment, and it was found that 43 per cent. showed new shoots and 57 per cent. were completely killed.

Left (Fig. 2).—A flowering plant pulled. Note the ring of turf pulled with it (scale in feet). *Right (Fig 3).*—Strong regrowth of shoot from roots left in the ground after pulling (scale in inches).

1938 Experiments

The indication in the 1937 experiments—that it might be possible to kill completely 50 per cent. of ragwort plants by pulling—was tested on a



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larger scale during the 1938 flowering season. An experiment involving the pulling of 160 plants was laid down at Mamaku in a cow-grazed pasture of rye grass and white clover. (Fig. 1.).

This time the areas from which the plants had been lifted were not dug, as it had been found that ragwort roots were capable of remaining alive in the ground for as long as eight months. The areas were therefore left without disturbance, and periodic observations were made throughout the twelve months following.

The experiment was begun in two sections; eighty plants were pulled when a few of the flowers were just opening, and a further eighty plants when the flowers were well developed and the first seed heads just ripening. The results from these two sections, however, showed that no significance could be attached to the different stages of flowering at the time of pulling.

A piece of pasture, generally from 2in. to 12in. across, came away with the roots (Fig. 2) when the plants were pulled. Where this was small it was possible to close the hole by treading firmly on the surrounding pasture, but usually a bare patch was left. At the close of the experiment twelve months later these had completely closed in, being covered mainly with grasses and clovers, together with a few weeds. About a quarter to a third of the root system was pulled with each plant; the remainder was left in the ground with some of the root ends exposed to the light.

A garden fork was used to loosen half of the first eighty plants lifted, with the hope that it would be possible to loosen the system and thus draw it out without disturbing much of the pasture. It was found, however, that more turf generally came away than was the case when no fork was used.

Final Inspection

At the final inspection of this experiment it was found that 66.2 per cent. of the plants were completely dead. The remaining 33.8 per cent. showed regrowths from roots which had been left in the ground. (Fig. 2).

Of the 66.2 per cent. which were completely dead at the final examination a small percentage had shown regrowths at one stage of the experiment, but these had died back. Of the total number of plants examined, 48 per cent. sent up no shoots during the whole duration of the experiment, while 18.2 per cent. sent up shoots which died back.

The failure of some of the shoots to persist after first making their appearance is an interesting phenomenon. Most of the plants pulled were almost mature—that is, the plants were in full flower with some ripe seed formed. It is known that the mature root, because of its anatomical structure, has a greater power of shoot production than root production, and also the mature root carries practically no reserves of food.

After these mature plants had been pulled some of the roots sent up shoots, but an adequate root system was not formed. During the cold, wet winter months these young regrowths were unable to survive the rigorous conditions and consequently died. The explanation lies in the fact that the root system was not sufficiently extensive and that there was no reserve food material available for the young plant. The shoots which persisted were most likely formed on younger roots.

No correlation could be found between the size or nature of the plant or the state of the pasture after pulling and the regrowths from roots left in the ground. The number of regrowths depends on the age of the root, the reserve material available in the root, and the conditions for the healing of the cut surface of the injured root.

During all the above experiments there was a liberal rainfall which would have been favourable for the formation of shoots from roots left in the ground. During a dry season it is likely that a higher percentage of deaths would be obtained.

Summary

These experiments have shown that the pulling of ragwort in the flowering stage can be expected to have at least a 55 to 65 per cent. control in the Waikato and adjacent districts. A much more extended use of such a method of control is therefore warranted where infestations consist of only scattered plants over a farm or along a roadside. In these cases plants can be pulled during farming operations as they come into flower, and the necessity of procuring chemicals and mixing them for a few plants is avoided.

Frequently when plants are left for chemical treatment the time is never found. They seed in the pasture, and this is disastrous, for ragwort produces a great quantity of highly viable seed. It is because of this seeding of odd plants that the weed is finding its

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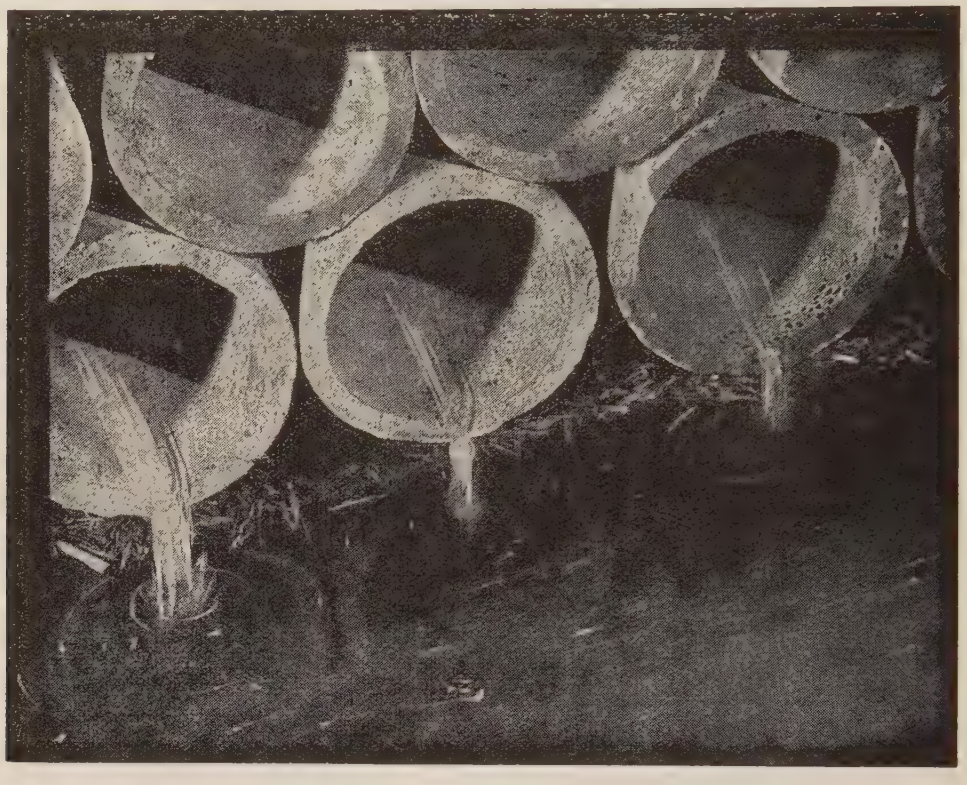
way rapidly into the good and hitherto ragwort-free pastures of the Waikato.

Every effort should therefore be made to eliminate the danger of such seed invading clean country. Pulling provides a method which is easy and at the same time more than 55 to 65 per cent. effective in killing the plants. If the stage has been reached when a number of the flowers are turning brown the plants should be carefully disposed of by burning, for, if left lying in the pasture, these flowers produce viable seed.

Care should be exercised in dealing with the plants that have been pulled.



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Maintenance Of Soil Fertility

Vital Factor In Arable Farming

R. McGILLIVRAY, Fields Superintendent, Christchurch.

ARABLE farming denotes a type of farming in which cultivation is prominent, and where many annual crops are grown. In farming of this nature the character and situation of the farm is of prime importance in connection with its profitable use. In choosing a farm an endeavour is generally made to secure something with a degree of soil heaviness and retentiveness, but frequently a good loam of a slightly lighter nature will be found more profitable for general farming purposes.

A vital factor in arable farming is the maintenance of soil fertility. In many districts the heavy cropping with cereals, especially with wheat and oats, has brought fertility to a low ebb, with the result that the soil texture has lost its kindly nature and the soil has become harsh and difficult to make into a satisfactory tilth, which is at all times necessary on an arable farm.

The depletion of organic matter in Europe is remedied by applying farmyard manure. This method has only very limited application in New Zealand, and our only means of replacing organic matter is by the growing of crops such as annual lupins, clover, etc., and ploughing these down at the flowering stage. When the organic content of the soil is high good crops may be expected.

Drain on Fertility

On many arable farms the fertility drain has been going on for the past 70 years, with the result that cereal crops are now much wider in the rotation, and even in these circumstances the yields are often unsatisfactory. Under these conditions the building up of the soil is a work of years of careful management. In many places liming of the land has proved an important operation, as it has resulted in the establishment of red and white clover with luxuriant growth, and there is no better or cheaper way to rejuvenate depleted soils.

In some places in New Zealand arable farming on the heavier soils is combined with dairy farming, and in districts where considerable winter feeding is necessary the very best use can be made of some of the arable crops grown on the farm. On the sharper soils sheep farming and the growing of crops go hand in hand, and most of our arable farms could perhaps be better described as mixed farms.

> A vital factor in arable farming is the maintenance of soil fertility. It is important to note that each crop requires individual treatment, and concrete instructions are given in this article.

On all arable farms, and especially on heavy soils, all farm operations have to be well-timed. The success of any crops can be marred by late and poor cultivation, and late working has often resulted in a whole rotation of crops being unsatisfactory because of defective soil conditions at the time of sowing.

Even with the best forms of cultivation crops may be indifferent if unfertilised, and experiments have clearly indicated that crops such as wheat, oats, barley, swedes, turnips, mangels, potatoes, etc., respond profitably to adequate dressing of a suitable artificial fertiliser. It is therefore imperative that arable farmers should fully recognise the importance of artificial fertilisers in raising profitable crops on their farms.

Wheat

Wheat, being a cash crop, usually occupies the position in the rotation most favourable to highest yields, that is, after grass when fertility is at a high level, after peas or rape following grass, or after potatoes. The seed bed for wheat requires to be well prepared, and lea land intended for

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wheat is greatly benefited by cultivation, such as skimming, followed by thorough cultivation preparatory to deep ploughing.

The ploughing under of a good tilth assists in the development of a strong root system, which enables the crop to withstand dry conditions often experienced during the final stages of growth. A moderately rough surface with well-worked soil underneath is the right condition for autumn wheat.

In the South Island experiments have shown that superphosphate at the rate of 1 cwt. per acre gives an appreciable increase in yield of the wheat crop, while extra quantities have not given increases commensurate with the extra cost involved. Experiences in the North Island indicate that quantities of up to 2 cwt. of superphosphate per acre are warranted, due, no doubt, to the heavier rainfall experienced there. Autumn-sown wheat crops showing a yellow unthrifty appearance in spring, due to lack of nitrogen, should receive an application of 1 cwt. of sulphate of ammonia in September, or a similar quantity of nitrate of soda in October.

Oats

The oat is one of the most important of our arable crops, the area devoted to its growth exceeding that of wheat. The oat crop does not demand so high a soil fertility as wheat, and is not susceptible to certain diseases which affect wheat. Oats may therefore advantageously follow wheat in the rotation.

The cultivation necessary in preparing land for oats varies with soil conditions and the preceding crop. Generally, the methods adopted are similar to those for wheat except that a less thorough preparation of the seed bed will often give quite satisfactory results. Manuring of oats generally follows that of wheat, one to two cwt. of superphosphate being applied with the seed.

Barley

The area in New Zealand devoted to barley amounts to approximately 20,000 acres annually. The most suitable climate for malting barley is that in which cool conditions are experienced during the growing period with plenty of sunshine during the ripening period.

The cultivation for barley is somewhat similar to that adopted for other cereals, although the crop is not so exacting in its requirements as wheat. Manurial experiments carried out over a number of seasons in New Zealand have shown that on almost all soils superphosphate at the rate of one to 1½ cwt. per acre produces a profitable increase in the yield of barley—increases usually amounting to from five to seven bushels per acre.

Potatoes

Although the area sown in potatoes on our arable farming lands is relatively small when compared with such crops as wheat and oats, potatoes are an important crop in certain districts where they appear regularly in the cropping rotation.

In damp seasons some of our lighter soils are capable of producing satisfactory yields of potatoes, but under normal conditions it is on the richer loams that really heavy yields are to be expected. The ideal soil for potatoes is a rich, deep, friable loam where

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evaporation of moisture in dry periods is relatively slow. Thoroughly cultivated and adequately manured, these are the soils which produce maximum yields of good-shaped tubers.

As a fertiliser for the potato crop a mixture consisting of three parts of superphosphate to one of sulphate of ammonia applied at the rate of from three to seven cwt. per acre has given highly satisfactory increases in yield over wide areas. Where responses to potash are obtained, the addition of 1 cwt. of this fertiliser to the super-sulphate of ammonia mixture is warranted.

Mangels

The mangel fills an important place in supplementing the supply of winter and spring feed supplies on many farms. Under the best conditions mangels are heavy yielders. If the soil fertility is not naturally high it should be improved by the ploughing in of suitable green manuring crops or farm yard manure where such is available.

The mangel is a deep rooted plant, and deep ploughing and cultivation are therefore essential to obtain best results. In most situations it is an advantage to have the land ploughed and worked down early to conserve moisture in the top soil before sowing the seed. The manurial requirements of the mangel vary with soil and climatic conditions. However, field experience over wide areas shows that good results may be expected from applications of five to six cwt. per acre of a mixture consisting of equal parts of superphosphate and blood and bone, or three parts superphosphate and two of blood and bone.

Swedes and Turnips

On our arable soils where mixed farming is practised, swedes and turnips are grown fairly extensively. In situations of good rainfall a percentage of such crops are sown on ridges and intercultivated, but in drier districts of the South Island the bulk of the turnip crop is sown on the flat.

As with other root crops grown under relatively dry conditions, early ploughing of the land for turnips and swedes is necessary to obtain the best results, and preparation of the seed bed should, if possible, be put under way some time before sowing in order to conserve moisture and thus ensure a good strike of the seed.

Extensive manurial trials carried out over a number of seasons indicate that carbonate of lime and superphosphate mixed in equal parts a few days before intended for use is a most satisfactory fertiliser to use with the turnip crop. Injury to germination of the seed can be entirely avoided if this mixture is used.

Paying results may also be obtained by lightly cross-drilling 1 cwt. of superphosphate into the crop when the plants are about four inches high. Apart from the stimulating effect of the fertiliser thus applied, the drill coulters act as cultivators and eradicate a percentage of weeds when these are present in the crop.

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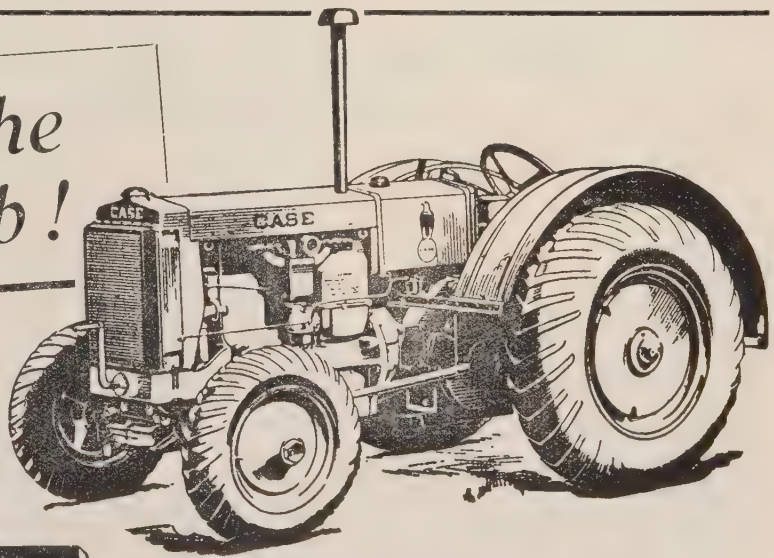

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Farms Under Irrigation——

Fig. 1.—Sheep grazing on irrigated pasture. Note the density of the sward.

Effect Of Canterbury Schemes On Stock And Pasture Management

A. A. COPLAND, Instructor in Agriculture, Temuka.

IRRIGATION in Canterbury will mean the gradual change-over from the present system of dry land farming, which entails the constant renewal of pastures every three to four years and the provision of artificial feeds for fattening and wintering, to a highly productive system of grassland farming.

The two main crops will be pasture and lucerne. The pastures will carry and fatten the stock during the growing periods of the year, while lucerne as hay or silage will be used during the winter and will gradually replace green feed and turnips. Both lucerne and pasture respond remarkably to irrigation, and will be of major importance under irrigation development.

The farmer on the light plains land of Canterbury today is always in fear of a drought. His standing flock must be regulated to the dry months of the year. This means that in the wet months of the year his pastures cannot be efficiently controlled. They become long, stemmy and unpalatable in early summer, while during the summer and autumn they are burnt up and overstocked. The result is the weakening of the pasture, especially the clovers, and finally the deterioration of the grasses and clovers and their replacement by weeds such as catsear, hair grass, and sweet vernal.

Bringing with them high production, high carrying capacities, and specialised management, the irrigation schemes in Canterbury will mean radical changes in the present system of farming. Salient points in the management of pastures under irrigation and the management of stock are discussed by the author, who concisely summarises his contentions into five cardinal points.

Under irrigation the story is entirely different. The pastures are grown from the rivers, so to speak—dry periods and droughts simply disappear, and the farmer is allowed to stock up to what in the past have been the "springs" of the year.

In South Canterbury there are two irrigation schemes, namely, Levels and Redcliff, both of which are active and, while they are as yet only in their infancy, results have been so pronounced, especially with pastures, lucerne and root crops, that none who have seen can doubt the success of irrigation. In this article the writer will attempt to pass on the results of investigation into pasture production under irrigation in South Canterbury and Ashburton.

Fig. 2.—A close-up of typical light, stony land in Canterbury which responds well to irrigation.

Fig. 3.—Stony land which has been sown down in pasture but not irrigated. Note the absence of clover and the stalky nature of the grass.

Fig. 4.—The same class of land under irrigation. This is a high production pasture with a splendid balance of grass and clover.

Sowing Down Pastures

The first step towards success is taken with the preparation of the ground and the sowing down of the pastures. The land must be thoroughly cleaned and well cultivated, the aim being to form a well-consolidated, finely-worked seed bed. The final stages of cultivation will consist of a light grubbing and harrowing and a rolling. A ton of lime to the acre is sown prior to these last operations.

The seed may be drilled or broadcast with 2cwt. superphosphate. Many have found that better establishment is obtained by drilling pasture on light plains, but care should be taken to make the sowing as light as possible, as with this method there is always a tendency to bury the clovers, which are of paramount importance in the pastures of plains land. The necessity for drilling the seed is eliminated where irrigation is to be carried out, as it has been proved that, even with a poor strike, the pasture can be brought up to first-class condition by an ample supply of moisture at the correct time. The paddock is finally harrowed, a light set of harrows being used.

The pasture may be sown in the spring, but autumn sowing is recommended. The farmer should always bear in mind that the better his pastures at the beginning, the quicker and greater will be its responses to water. Good water and time are wasted on poor grass. In no circumstances should the farmer sow anything but certified strains of ryegrass and clover.

High production is the goal, and this can be achieved only by the sowing of strains of proved persistency and yield. True, water will bring poor pastures back and perhaps a very fine cover will be produced, but this takes time and money and the pasture will never be as good as the one which has been well sown down.

Mixtures Used

From observations made by the writer on pastures under irrigation at Redcliff, Levels, and on the demonstration area in Ashburton, certified ryegrass and certified white clover appear to be outstanding. A tight, dense pasture ideally suited to close grazing under controlled management and a greater quantity of feed is produced. The mixture recommended is as follows:—

25-30 lbs. of certified perennial ryegrass.
2-3½ lbs. of certified white clover.
2 lbs. dogstail.
3 lbs. certified Montgomeryshire red clover.

Cocksfoot has long been recognised as a valuable pasture plant on light plains land, but, while it produces a good growth of feed under irrigation and especially during the summer and autumn months, it does not appear to stand up to the grazing of the ryegrass and clover. Further, it is much slower in recovering after stocking.

Subterranean clover has also been tried out, and, although it is yet too early to dogmatise, in the opinion of the writer it has nothing to recommend it over good type white clover and ryegrass. The fact that it dies off about December and is not ready for feeding again until late autumn is

Fig. 5.—Pasture on irrigated border on Mr. Hammond's farm, Winchmore—the results of correct establishment and management under irrigation.

Fig. 6.—Pasture on non-irrigated border on Mr. Hammond's farm. The establishment and subsequent treatment was identical, but there was no water.

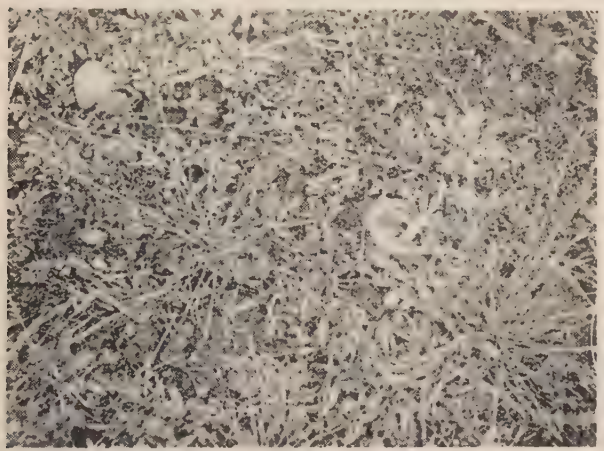

Fig. 7.—Three-year-old pasture on the Levels which has completely run out through non-irrigation. Compare with Fig. 8.

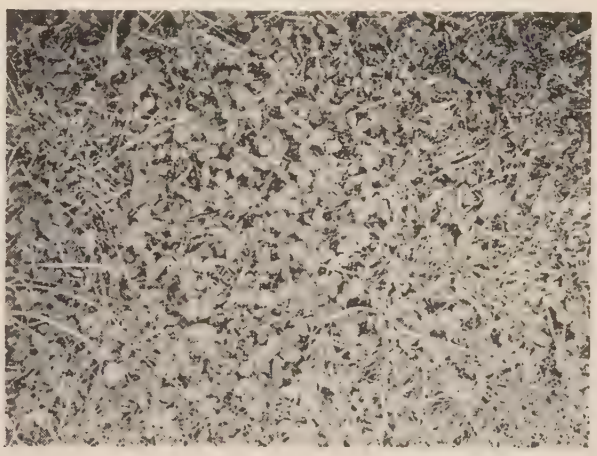

Fig. 8.—The adjoining irrigated paddock to Fig. 7 with three-year-old pasture. Note the volunteer white clover induced by ample moisture.

Fig. 9.—Showing just what irrigation means to the plants—Montgomery clover for seed on Mr. H. Nixon's farm, Washdyke.

Fig. 10.—Montgomery clover which has received no water on Mr. Nixon's farm.

a drawback, but no doubt it will have a place under irrigation for winter feeding and lamb fattening. Present indications are, however, that ryegrass and white clover will take foremost place under irrigation.

When To Start Irrigation

Water is applied during the part of the year which corresponds, in general, with the period of plant growth. The beginning of the irrigating season will depend largely on the amount of seasonal precipitation, the character of the soil, and the **climatic** conditions prevailing, especially the temperature of the soil and water. The bulk of the Levels and Canterbury plains are stony, silt loams, fairly porous and coarse, and with a low retentive power, which require early irrigation.

Under normal conditions on the Levels plain there is a little or no need for irrigation until about the middle of October. Immediately the plants begin to show signs of suffering from lack of moisture, however, irrigation should be commenced. The foregoing also applies to young pasture sown in the previous autumn. In the case of spring-sown pasture irrigation may be started when the secondary roots of the grasses are firmly established.

Frequency of Irrigation

Pastures on these light soils require frequent irrigation to maintain continuous and vigorous growth. The soil should never be allowed to dry out sufficiently to cause the wilting of the plants, and the aim of the irrigator should be to apply water so that the soil moisture content will range on either side of the optimum amount for plant growth.

The interval between irrigations will of course, depend on the amount of rainfall, but, with dry weather conditions prevailing, pasture in Canterbury gives greatest growth if watered regularly every two to three weeks. Under such a programme of watering the grasses and clovers are never in lack of moisture and, with the warmth of the ground such as is experienced during a normal Canterbury summer and autumn, the condition, for plant growth are ideal.

The quantity of highly nutritious and palatable feed produced is nothing short of amazing. The pasture quickly thickens up, and a dense sward of clovers and grass is the result. With the pasture thoroughly established, the cover is perfect, and when this stage is reached losses from surface evaporation are reduced to a minimum. The irrigation interval can then be lengthened to perhaps three weeks. Nevertheless, the importance of frequent irrigations cannot be overstressed.

The paddocks under pasture on the Levels Demonstration Farm (Mr. C. E. Kerr) and at Ashburton Demonstration Farm (Mr. W. Hammond) are watered every two or three weeks, and the writer can say confidently that they are definitely the best pastures in their respective districts. In fact, the irrigated pastures on Mr. Hammond's farm are, in the opinion of the writer, the best he has seen in Canterbury.

The pasture should receive a thorough and final watering towards the end of autumn to enable a strong root development and so to ensure early feed in the spring. This aspect will be discussed in a future article.

Topdressing the Pasture

Topdressing trials are being carried out by the Department of Agriculture on both the Levels and at Ashburton. This aspect of irrigation management will be thoroughly investigated, but at this early stage detailed results are not to hand. Lime and superphosphate, however, give a very definite response under irrigation.

It must, of course, stand to reason that the more feed there is produced

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and the more sheep and wool grown, the greater will be the drain on the phosphates and lime of the soil. If the limiting factor to production is not to become one of the plant nutrients, then an adequate programme of topdressing must be carried out.

Stock Management

The first essential is to have the paddock well subdivided so that a controlled system of stocking can be carried out. Paddocks of from 12 to 16 acres seem to be about the desirable size. The aim is to stock with fairly big mobs of sheep for a short time. The herbage is uniformly clipped and selective grazing prevented. Further, with heavy stocking for a short period there is less waste from fouling the pasture. The practice carried out on the Levels and Ashburton demonstration areas can be summarised as follows:—

1st of month.—Water pasture and spell.

Approx. 7th of month.—Stock.

Middle of month.—Water pasture and spell.

Approx. 23rd of month.—Stock.

End of month.—Water and spell.

N.B.—The number of waterings will, of course, depend on the rainfall.

The stock are left on for sufficient time to graze the pasture to within about an inch of the ground and are then removed to the new block. The farmer must always guard against overstocking his pastures, as continued severe defoliation will quickly ruin the plants. This mistake is common with beginners. A farmer will water a paddock and, if the weather continues dry, will overstock this only green paddock he has and in many cases the grasses and clovers will be completely eaten out. Controlled grazing, on the other hand, gives the pastures every chance; they recover rapidly and produce to a maximum.

Fig. 11.—Note the burnt-up pasture along the top of the banks of the dykes.

Controlled Grazing

Towards the end of the autumn the pasture should be spelled for a period, and during winter heavy stocking should be discouraged. The spelling of the pasture during autumn allows for good root development and consequently a strong and early growth in the spring.

Martin G. Jones, Jeallots Hill, has shown that plants make a distinct effort to retain a certain ratio of green plant to the rest of the plant even though the temperature is below that for requisite growth. If, then, the winter grazing is too hard this growth, which is called the dormant growth, is made at the expense of the whole plant and is reflected in the weakness of the pasture in the spring. It is obvious that good stock management must be practised if the best results are to be obtained from the irrigation.

Irrigation means high production, high carrying capacities, and highly specialised management.

Summary

(1) Sow down with only the best strains of grasses and clovers (certified) on a well-prepared seed bed.

(2) Water at regular intervals, at no time allowing the pasture to suffer from moisture deficiency.

(3) Adopt a system of controlled stock management.

(4) Water in the autumn; spell and graze lightly during the winter months.

(5) Carry out a liberal programme of topdressing, preferably twice during the year—once in the spring and once during the autumn.

All the photographs, with the exception of Figs. 2, 3, and 4, which were taken by W. W. Dunsterville, were taken by J. G. Duncan.

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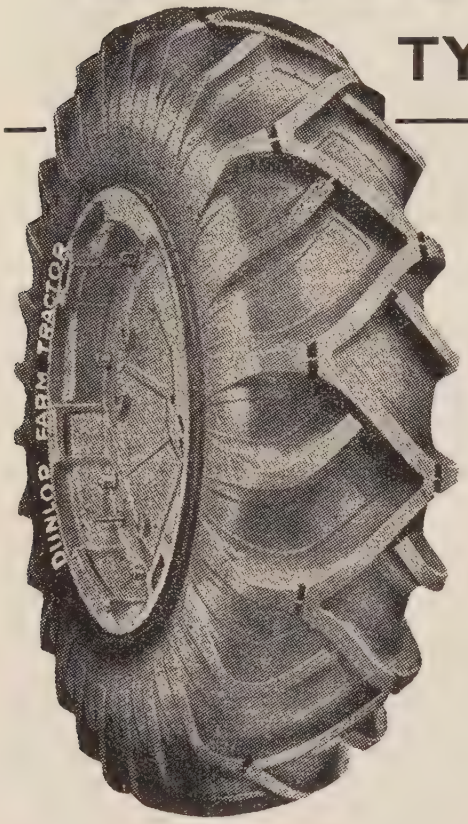

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Augmenting The Farm Water Supply

Planning And Constructing the Reticulation System

(Continued from April issue.)

P. S. SYME, Instructor in Agriculture, Warkworth.

In this final of a series of articles the author discusses the planning and construction of the farm water supply reticulation system. Particular emphasis is placed on the fact that even under very adverse conditions careful planning may do much to provide an efficient system without involving an abnormally heavy expenditure.

Fig. 1.—Tanks raised on trestles to provide a gravitation supply. If a modern automatic pressure outfit is installed this expense would not be necessary.

WHEN installing a farm water supply very careful consideration should be given to selecting the sizes of pipe. The size of pipe used is important, not only as affecting the initial cost of installation, but it may also have a very marked bearing on the actual pumping costs, the effective life of the pipe line, and the general efficiency of the system.

In normal circumstances where water has to be pumped, two factors must be taken into account—the power required to raise the water against gravity, and the effort required to force the water through the pipes. This latter, known as the friction head, though sometimes in danger of being overlooked, is usually the more important factor as affecting working costs.

Friction Head.

It has been found that the friction depends on the size of the pipe and on the rate at which the water is made to flow through it. The smaller the pipe or the greater the flow, the greater will be the friction head. The friction heads for varying conditions have been calculated, and are expressed as equivalent vertical lifts per 100 feet length of pipe, as follows:—

Gallons per Minute.	Size of Pipe.				
	½in.	1in.	1½in.	2in.	3in.
½	3	—	—	—	—
1	7	0.3	—	—	—
2	18	0.7	—	—	—
3	40	1.3	—	—	—
4	70	2.5	—	—	—
5	110	3.8	0.5	0.2	—
7	200	7.0	—	—	—
10	430	13.0	2.0	0.5	0.1
20	—	45.0	7.0	1.7	0.2

Example.—Suppose water is being forced at a rate of three gallons per minute through a half-inch pipe to a height of 80 feet, the total length of pipe being 800 feet.

In this example power will be required (a) to raise the water 80 feet against gravity, and (b) to overcome the friction head, which as seen in the table above is 40ft for each 100ft of length of pipe, i.e., 320ft. This gives a total head of 80 + 320 = 400ft.

Size of Power Unit.

The size of the power unit required can be very simply calculated by multiplying the total head by the number of gallons to be pumped per minute and dividing this by 2500.

In the example just quoted the total head is 400ft. The horse power required for pumping would be:—

$$\frac{400 \times 3}{2500} = \frac{1}{2} \text{ H.P. approximately.}$$

Using a 1in pipe, the total head is reduced from 400ft to 90.4ft, namely:—

Vertical lift, 80ft.

Friction head, 1.3 × 8 = 10.4ft.

Total head = 90.4ft.

$$\text{H.P. required} = \frac{90.4 \times 3}{2500} = \frac{1}{9} \text{ approx.}$$

This means that only about one-quarter of the power is required to operate the pump when the larger pipe is employed, and the lower pumping cost might more than compensate for the increased cost of the piping.

Reference to the above table will show that the friction head increases very rapidly for relatively small increases in the quantity of water pumped, but diminishes considerably with slight increases in the size of the pipe used. For this reason unduly small pipes may, in the long run, prove more expensive than larger pipes. Where the water contains impurities likely to form a crust in the pipe, the friction head may gradually be so increased as to greatly impair the efficiency of the system.

Reservoirs

The reservoir may consist of one or more iron tanks, according to the capacity required, or it may be made of concrete. The objections to iron tanks are obvious—they wear out and the water readily becomes warm in hot weather. Concrete reservoirs are more expensive to build, but they are practically everlasting, and when a large storage capacity is required they may be preferred to iron tanks.

Concrete reservoirs may be constructed either above or below the ground. The latter maintain the water at a more even temperature, but they are usually more difficult to build. Whatever type of reservoir is selected, care should be taken to see that ample storage is available, and in this connection consideration should be given to such factors as the reliability of the motive power and pump and the facilities for effecting repairs in the event of a breakdown. Under normal conditions at least one day's supply should be provided, and this should be regarded as the minimum for safety. Most farms now install the automatic pressure system, which renders the reservoir unnecessary and sometimes effects a considerable saving in costs.

Selecting the Site

Where a reservoir is employed to provide a gravitation water supply to the different paddocks on a farm its position is frequently of importance as affecting reticulation costs. In practice, the best site will depend to some extent on the position of the pump, and, if available, of any convenient natural eminence.

If practicable, the reservoir should be centrally situated so that the length of piping to any field is not unduly long, as this to some extent avoids the necessity of using expensive large-sized piping. Increasing the height of the reservoir reduces the size of pipe needed to distribute the water, but increases the cost of pumping.

The following table shows the approximate quantities of water which will be delivered for different falls by pipes of various sizes each 1000ft long:—

Fall in feet	Discharge in galls. per minute.				
	½in.	¾in.	1in.	1¼in.	1½in.
20	.74	2.03	4.18	7.28	11.5
30	.90	2.48	5.11	8.92	14.1
50	1.16	3.21	6.61	11.5	18.2
100	1.65	4.55	9.35	16.3	25.7
200	2.33	6.24	13.2	23.0	36.3

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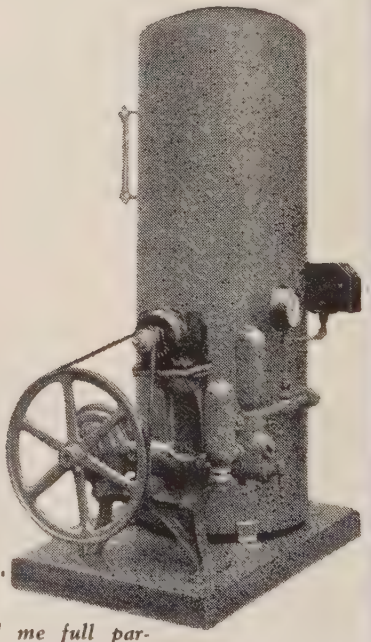

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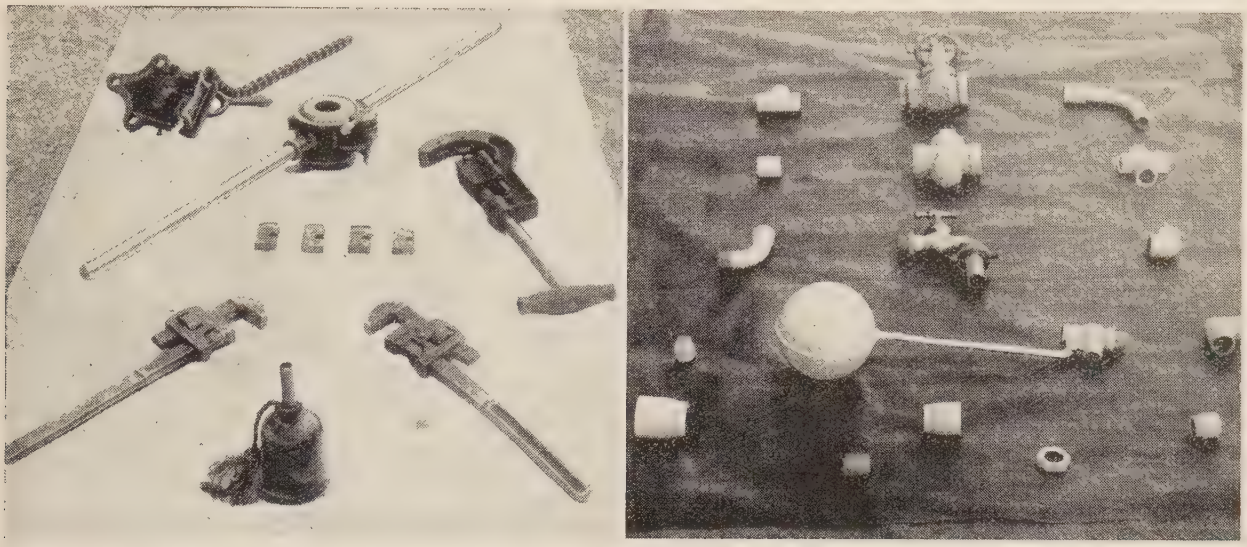

Fig 2.—Left: The tools for the job showing vice, stocks and dies, pipe-cutter, wrenches and oil-can. *Right:* Assorted pipe fittings, including stop-cock, non-return valve, union, reducing sockets, bends, tee, cross, plug, nipple, back nut, round and square elbows.

having regard to the head available, to secure an adequate supply at the troughs, increasing the size merely increases the cost with no compensating advantage, as the water flows by gravitation.

Size of Delivery Pipe

The delivery pipe from the pump to the reservoir should be of ample size. As the whole of the water used must be pumped through this, too great economy in the size of the pipe must be paid for by increased pumping costs throughout the lifetime of the system. Considering also that, as already shown, the friction head mounts rapidly when a large quantity of water is forced through a small pipe, account should be taken of the full capacity of the engine and pump so that these may be enabled to operate to the best advantage and with a minimum of working time.

The following table shows the efficient capacity of different sizes of pipe, and these sizes should be used wherever the length exceeds about 600 feet:—

Gallons per Minute.	Diameter of Pipe.
½	½in.
¾	¾in.
1½	1in.
3	1¼in.
5	1½in.
10	2in.

Reticulation System

When the positions of the pump and reservoir have been decided and convenient sites found for the various troughs, the line for the pipes can then be marked off. This should be very carefully planned to avoid unnecessary duplication and to prevent waste of pipe. It should be noted that the supply pipe to the reservoir can sometimes be used also as the delivery pipe for much of the farm reticulation, thereby greatly reducing the cost both of labour and of material.

The work of preparing the trench may be expedited by the use of the plough, leaving only the finishing work to be done by spade. The pipes should be laid deep enough to be safe from frost and, when the land is cultivated, from implements. For most purposes a depth of from 12 to 18 inches is sufficient, though the water will be cooler in hot weather if the trench is deeper.

When laying the pipes care should be taken to see that the ends are not obstructed by small stones or dirt, as this is a frequent source of trouble, which may be very hard to rectify at a later stage.

The work of laying the pipes is a comparatively simple job, the lengths being laid along the trench and coupled section by section. Where a lead-off is to be taken, the pipe is cut where necessary, threaded, and a right-angle bent or tee-piece fitted as required. Reducing sockets are used where it is desired to reduce the size of the pipe.

AUCKLAND—20-ACRE SEMI-SUBURBAN GOING CONCERN FOR £1250

ALL level to easy undulating land, all in grass. Fair 4-roomed house, bathroom, electric lights. Telephone. Good 2-bail cowshed, concrete floor. Situated 1½ miles from station, Post Office, etc., and 1 mile from school. PRICE INCLUDES 14 cows and springing heifers, separator, with electric motor, cream cans, buckets, chain harrows, etc. £500 deposit.

A GOOD PARTLY IMPROVED FARM PROPOSITION

394 ACRES. At present farm is being grazed, but wintered 130 head cattle and 200-300 sheep. Mostly undulating land, good quality, well watered; 6-roomed house, bathroom, 6-bail cowshed, shearing shed, etc. Situated about 2 miles from school, Post Office, etc. Cream collected, telephone. PRICE £2300. Only £400 deposit, balance State Advances mortgage. Farm requires more work done on it, but could soon be made into a really good property.

SOUTH AUCKLAND—105-COW GOING CONCERN OF £1500 DEPOSIT

218 ACRES. Mostly flat to easy undulating land; 17 paddocks, well watered. Owner states property will carry 120 cows. Double house, one of 5 rooms, elec. light, kitchenette, etc., 10-bail cowshed, also numerous outbuildings. Connecting house of 4 rooms, elec. light, kitchenette, etc. Situated 2 miles from school, 4 miles township. PRICE £32 PER ACRE, including 86 cows, 19 heifers, 18 calves, 2 bulls, 4 sows, 1 boar, 3 horses, also full range implements, etc. This is a splendid property, and is very suitable for fattening lambs.

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When making a union it is usual to paint the threads and sockets with red lead and to bind in a few strands of hemp. This method gives a good watertight joint but may cause some difficulty if the joints are to be unscrewed at any time, and for this reason graphite paste is sometimes to be preferred to red lead.

Copper floats should be used for the automatic ball-cocks, as any other metal proves unsatisfactory. The delivery pipe should be fitted with a check valve at the pump end and a stopcock where the pipe enters the reservoir. A stopcock of the peet valve type, which allows water to pass through the full bore of the pipe, should be fitted to the supply pipe at the reservoir, as this is useful when making repairs or alterations to the line.

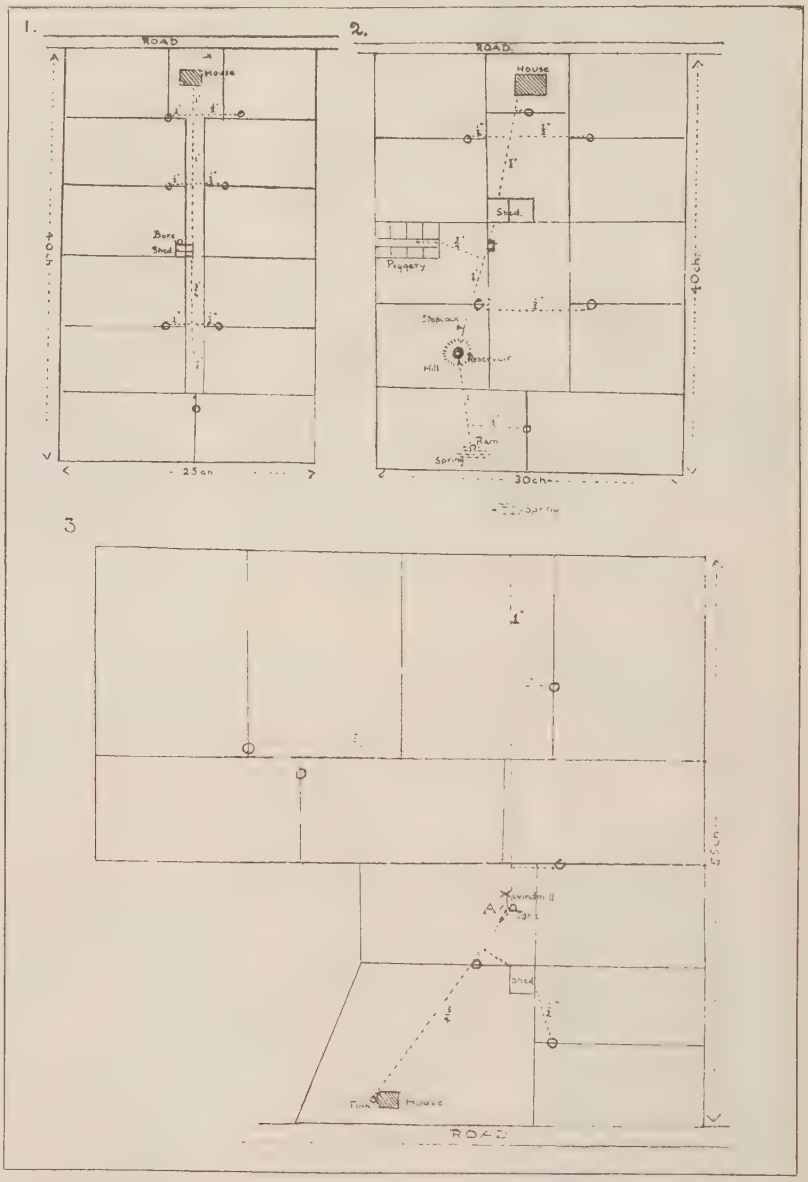
The filling-in of any section of the trench should be delayed until the water has been turned on at full pressure, as this allows leaks to be readily detected and avoids the necessity of reopening the trench.

Reticulation in Diagram

(1) In this diagram the water is pumped from a bore into a tank at the shed. Water is led off from the tank through a 1in pipe to the house, and from this pipe half-inch leads are taken to the troughs. The remainder of the farm is supplied through ¾in pipe, with half-inch leads to the three fields as shown.

(2) Water from a stream running through the farm is pumped by means of a ram up to a reservoir situated on a piece of high ground. Because of the distance between the house and reservoir a 1in pipe is used throughout the main lead. A ¾in lead is used to supply the piggery, and ½in leads are taken where required to troughs in the cow paddocks. Note that the supply pipe to the reservoir is used as the delivery pipe to two of the fields.

(3) A spring is available at sufficient height to supply the greater part of the farm gravitationally. The water is led from the spring through a 1in main with ½in lead-offs to the troughs as shown. The main pipe connects with a tank at A, and the water is kept at a constant level by a ball-cock. From this tank the water is pumped by means of a windmill to a storage tank at the house. A ¾in pipe is used, and from this a ½in lead-off supplies water to the cow-shed and an adjacent paddock.



Cost of Reticulation

Some farms are naturally endowed with good facilities for watering stock. On such farms the reticulation costs are low, and may amount to less than 10s per acre. Certain farms, on the other hand, have but a niggardly supply of water, and even this may be obtained only at a considerable cost, which may yet be still further increased where the lay-out of the farm makes reticulation difficult. On such farms the cost of an efficient supply may well exceed £3 per acre.

Even under very adverse conditions, however, careful planning may do much to provide an efficient water supply system without involving an abnormally heavy expenditure. Admitting that farmers as a class tend to become individualists and frequently do not take kindly to systems of common ownership, much may be done by mutual effort, and the success achieved by various group reticulating systems such as those employed at the Galatea settlement, on the Hauraki Plains, and in numerous other districts bears witness to the value of co-operation in the provision of cheap and highly efficient farm watering facilities.

Design Of The Milking Shed

Description Of The Walk-Through Type

Contributed by the DAIRY DIVISION.

THE DESIGN of the walk-through shed is not new, as it was used in New Zealand in the very early days. It was not, however, until the milking machine became a practical unit that the walk-through shed came into general favour. The speeding up of shed work after the adoption of machine milking was responsible in a measure for an increase in the dairy herds, and the shortage of labour during the Great War showed the possibilities of reducing the amount of labour required to handle them.

In general, the milking shed is a special purpose building erected away from any other building on the farm, and having yards and exits all designed to provide facilities for the quick handling and disposal of the cows when milked.

Bail feeding under these conditions need hardly be considered, although it is possible to provide facilities for this purpose if it is desired to do so.

Little Alteration

The design of the shed itself has altered little since it was first adopted, and the various plans which have been issued by the Dairy Division show comparatively little change in that part of the building. The main changes have been in the design of the exit doors. These have now been standardised, and are hinged so that they all open one way into an exit race three feet wide for Jersey cows and 3ft. 9in. for larger breeds.

Doors which opened right and left, pivoted doors, and others which were suspended and slid up and down have all been tried and discarded, while the wider race, which allowed a cow to turn around in it and hold up those behind her, has been replaced by a narrow one with an exit at the end farthest away from the releaser room. The discharging of the cows at the narrow end reduces the difficulty of maintaining a clean exit where they step off the concrete race.

A modification of the dummy and race has come into favour in certain districts during recent years. This was first used in the Waikato, but has not become so popular there as in some other parts of the Dominion. Here, again, there is evidence that the idea is not new.

Wall Close-Boarded

In this type of bail the wall at the cow's head is close-boarded to a width of 16 inches, while the space behind the dummy, approximately 4ft. 4in. wide, is left open. The sides of the dummy are swung on hinges from the posts at the end farthest away from the back wall of the shed, thus forming swinging gates or doors which, when shut, form stalls 16in. wide at the head of the cow and 27in. wide at the back. The gates, or doors, when closed, are fastened by a lever behind them which slides through iron brackets into notches in the posts at the cow's head. To let the cows out, the levers are withdrawn from the notches and the gates swung back, right or left.

If the swinging side and the inner end of the dummy are close-boarded and the top of the dummy is also boarded over at a height which allows the cows to pass under it, the shed is more or less draught-proof, but in order to make it wholly so a further alteration has been made in some districts.

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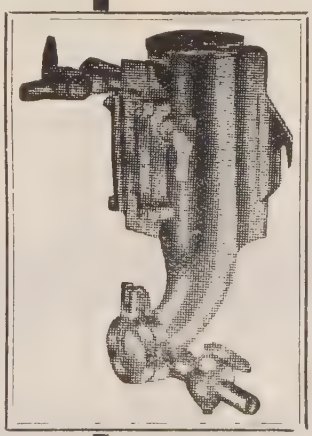

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In this type of shed the back wall is extended out three feet, making a total depth of eighteen feet. This extension provides a race 3 feet wide inside the shed. In some cases the shed wall at the opposite end from the releaser is also extended 3ft. beyond the last bail. By this means a race within the shed is provided and the cows are discharged into a yard alongside the one in which they were held before being milked.

This plan can, of course, be followed with the older type of shed, and although it increases the cost of the building it also adds materially to the comfort of the milkers.

Other advantages claimed for this style of bail are that in the 16 inches at the cow's head a feed box can be erected, and that, because of its shape, the cow is more closely confined.

Rival Type

Lest it should be thought that the walk-through shed was adopted without consideration being given to any other type, it may be well to mention its one rival, the race-shed, which was popular in certain districts during the early days of the change-over from the older class of shed.

The race-shed was a building about 15ft. wide over all. Along one or both of the longer sides was a race to accommodate, say, four cows. At each end of the race was a door, one for the cows to enter and one for an exit, the yard and releaser room being situated at the entrance and exit end respectively. The bottom rail of each race was high enough to allow for milking, and behind the three cows in front a cross-rail was placed.

The milking machine pipes ran down the centre of the shed, and while the cows in one race were being milked those on the opposite side were being stripped and replaced with fresh ones. Obviously, the race could not be emptied and refilled until the slowest cow in it had been milked. This is a distinct disadvantage compared with the walk-through shed, in which individual cows can be released as soon as they are finished.

From the point of view of hygiene, the race-shed left much to be desired. Even if only rails were used on the lee side the atmosphere was not good, and it was almost impossible to keep the walls clean. The drainage was just outside the wall along each side of the building, and in many instances was neglected.

Department's Plans

These and other points which have not been mentioned led to many reconstructions from the race to the walk-through type of shed, and for many years the plans provided by the Dairy Division have all been of the latter type.

Plans issued in 1912 provided for a bucket plant milking machine. The

ANOTHER
OSMONDS'
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One of Osmonds' Netherwood herd of Ayrshire cows, "BROOMLANDS BLOOM" (40605)
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OXYGAS
OXYGAS the world famous remedy for inflammation after calving and lambing quarter evil, and fever in sheep.
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yard was built some distance from the shed, and was connected to it by a concrete race. An engine room only was provided, and the milk stand and separator room were placed some distance from the shed, but it was a very short step from this arrangement to the hand separator with power drive placed in the engine room. For the sake of fuel economy the kerosene combustion engine was in common use, and it was found that where these were placed in the same room as the separator the fumes from the engine were absorbed by the milk and cream. This applies to the petrol engine also, although to a lesser degree, and at the present time we find the crude-oil engine in fairly common use.

As releaser milking spread, the position was aggravated by placing the releaser in the engine room, and consequently a second room had to be provided. The relationship of these rooms to the milking shed and to one another then required consideration. This has been altered from time to time in the light of experience, but the general order is that the releaser and separator room must be between the milking shed and the engine room, where the latter is used.

Draught-Proof Walls

The wall between the shed and the releaser room must be draught-proof and have only such openings as are required for the connections to the milking machine and vacuum pump. There must be no door in the walls between the releaser room and the shed, nor between the releaser room and the engine room. The wall between the engine room and the releaser room must also be draught-proof except for the opening for the shaft.

If the drive to the vacuum pump is by belt from the engine room to the releaser room the engine room must be separated from the releaser room by two draught-proof walls two feet apart, having minimum openings to allow for the passage of the belt. All these walls must extend the whole height and width of the space between the rooms mentioned.

In the meantime, we have arrived back at the point where we started. In those districts which are served by electricity only one room is required if the power used is an electric motor. As no offensive odour is given off by the motor no exception is taken to placing it and an electric water heater, if one is used, in the same room as the releaser and separator.

We thus have a plan which provides for a releaser and separator room attached to the milking shed, and, if desired, this room can also be used as a milk-holding room without detriment to the milk, provided the surroundings are kept in good order and free from contaminating influences.

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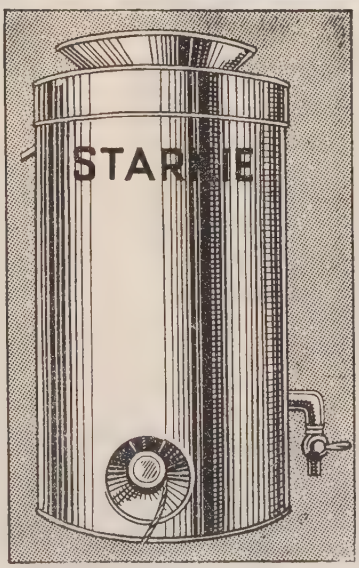

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Cobalt Topdressing Experiments

Excellent Results In The King Country

W. G. BONNER, Inspector of Stock, Te Kuiti, and K. J. McNAUGHT and G. W. PAUL, Chemistry Section, Department of Agriculture.

IN FEBRUARY, 1938, at the instance of the Native Department, controlled experiments were commenced by the Department of Agriculture on the Native Department's farms at Waimiha and Ngapaenga to test the value of cobalt topdressing in the treatment of the stock ailments experienced in these localities. Waimiha, on the Main Trunk Line about 20 miles south-east of Te Kuiti, is on the outskirts of the region affected by the Taupo pumice showers, while Ngapaenga, in the Mairoa district about 20 miles west of Te Kuiti, is typical of the region affected by the older Mairoa andesitic shower. In both districts great difficulty had been experienced in rearing young stock.

The experiments were commenced in February, 1938, and were continued for a year, terminating late in February this year. The sheep used were drafted from a line of two-tooth hoggets from the Gisborne district, the animals in each group being weighed and tagged within a few days of their arrival on the respective farms and then drafted in order that the average weight in the control and cobalt paddocks should be the same.

Waimiha Experiment

The cobalt paddock of 10 acres was topdressed on 8th February, 1938, with 2 cwt. of cobaltised superphosphate (containing 14 ozs. cobalt sulphate per cwt.) per acre. The control plot of five acres received 2 cwt. of ordinary superphosphate per acre instead of the cobaltised superphosphate.

The average weights of the experimental ewes and lambs throughout the experiment, together with the cobalt content of the pastures, are given in Table 1.

The increased cobalt content of the pastures following the application of the cobaltised topdressing on 8th February was very noticeable. Even in late January, 1939, nearly a year later, the cobalt content of the pasture from the cobalt paddock was more than twice that of the control and was still at a good healthy level (more than 0.10 p.p.m.).

> Excellent results have been obtained in the control of "bush sickness" at Waimiha and "Mairoa dopiness" at Ngapaenga from the use of cobaltised superphosphate.

Ngapaenga Experiment

Two paddocks each of 10 acres were used for the Ngapaenga experiment, and 15 ewes were run on each. The control paddock was topdressed on 10th February, 1938, with 2 cwt. of superphosphate to the acre. The cobalt paddock was topdressed on 14th February at the rate of 1 cwt. of cobaltised superphosphate (containing 14 oz. cobalt sulphate) per acre, together with 1 cwt. of ordinary superphosphate. A further topdressing was applied on 18th October, 1938, 1 cwt. of cobaltised superphosphate (14 ounces cobalt sulphate) being applied on the cobalt paddock and 1 cwt. of ordinary superphosphate on the control paddock.

The average weights of ewes and lambs throughout the experiment, together with the cobalt content of the pasture are given in Table 2.

As in the Waimiha experiment, the good results from the use of the cobaltised superphosphate are correlated with the increase in the cobalt content of the pastures from an unhealthy level (about .06 p.p.m.) to a healthy level (more than 0.10 p.p.m.) which has been maintained throughout the experiment.

Though the results in the Ngapaenga experiment have not been as spectacular as at Waimiha because of the fact that the control animals remained relatively fairly healthy, nevertheless the Native Department has been so satisfied with the results that it has been decided this year to use only cobaltised superphosphate topdressing on the farms at Waimiha and Ngapaenga.

Farmers Interested

A great deal of interest in these experiments has been taken by farmers in the King Country, many of whom will be using cobaltised superphosphate this year. The improvement in stock health and in the quality and yield of wool should more than compensate them for the small additional expense involved.

In these experiments the amounts of cobalt used were fairly high, and there is evidence from other work that smaller amounts are sufficient. In cobalt deficiency areas topdressing with superphosphate containing sufficient cobalt to give between 5 and

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10 ounces cobalt sulphate to the acre is recommended.

One of the fertiliser firms markets a registered "cobaltised superphosphate" containing 6 lbs. cobalt sulphate to the ton (five ounces to the cwt.), but cobaltised superphosphate can be obtained from other fertiliser manufacturers according to requirements. In ordering cobaltised superphosphate the farmer is advised to specify exactly what strength he requires.

Acknowledgements

The experiments were facilitated by Mr. A. F. Blackburn, Chief Field Supervisor of the Native Department, who provided the necessary stock and funds. The original drafting of the sheep was supervised by Mr. D. Marshall, District Superintendent of the Livestock Division. The assistance of other officers is gratefully acknowledged, and credit must go to the farm managers, Mr. A. Aldworth at Ngapaenga, and Mr. T. Jones at Waimiha, whose co-operation helped to make this work possible.

WAIMIHA EXPERIMENT
(Table 1)

	19/2/38	21/3/38	28/4/38	23/5/38	20/6/38	26/7/38	29/10/38	10/12/38	23/1/39	27/2/39	Av. Wool 6/12/38
Average wt. in lbs. 10 ewes control paddock	87	102	107	110	110	106	118	106	96	92	9.7 lbs.
Average wt. in lbs. 20 ewes cobalt paddock	88	104	108	114	117	122	137	131	138	141	12.0 lbs.
Average wt. in lbs. 5 "control" lambs born Sept. to Nov.							20	36	34	All dead	
Average wt. in lbs. 18 "cobalt" lambs born Aug. to Nov.							34	56	77	82	
Parts per million cobalt in dry matter "control" pasture	4/2/38 0.08		0.08		0.12			0.04	0.06		
Parts per million cobalt in dry matter "cobalt" pasture	0.06	1.03	0.96		0.70			0.10	0.14		

NGAPAENGA EXPERIMENT
(Table 2)

	24/2/38	22/3/38	27/4/38	27/5/38	25/6/38	29/7/38	29/10/38	21/11/38	23/1/39	28/2/39	21/11/38 Av. Wool
Average wt. in lbs. 15 ewes control paddock	93	105	102	106	110	111	115	95	103	127	10.1 lbs.
Average wt. in lbs. 15 ewes cobalt paddock	93	104	102	111	116	117	135	115	126	144	11.6 lbs.
Average wt. in lbs. 12 "control" lambs							28	35	46	58	2.4 lbs.
Average wt. in lbs. 10 "cobalt" lambs							49	55	68	80	4.9 lbs.
Parts per million cobalt in dry matter "control" pasture	23/11/37 0.04		0.07			0.08		0.06		0.06	
Parts per million cobalt in dry matter "cobalt" pasture	0.04	0.39	0.25			0.69		0.36		0.19	

NOTE.—Two control lambs and one cobalt lamb died at birth.

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Thousands of Dairyfarmers throughout the Dominion are praising MILKEEZE—the ideal preparation for sore, wounded teats, and cracked, swollen udders.
MILKEEZE keeps teats soft and supple. Positively does not taint the milk. *From all Chemists and Stores in* 1-lb. tins, **2/3** 4-lb. billies, **6/6** 26-lb. tins, **1/4** per lb.

Pig Production In The South

Problems And Possibilities In Otago And Southland

N. MACDONALD, Supervisor, Otago and Southland District Pig Council.

AN INCREASE of 43,434 sows has been recorded in New Zealand between 1928 and 1938, or an increase of 62 per cent. during the ten-year period 1928-1938. In Otago and Southland the figures for the same period were 4397 sows in 1928 and 4638 in 1938, or an increase of 5.4 per cent.

The reasons for the lack of interest in pig raising in Otago and Southland appear to be climatic conditions, whey feeding, and mixed farming. None of these reasons is sufficient to make pig producing unpayable and provided the management is efficient, there is no reason why equally good results should not be obtained in the Southern districts as are obtainable in the North.

In Otago and Southland the winters are longer and a little more severe than in the North, and there is a shorter milking period for the dairy farmers. This means that the farrowing periods of the sows must be carefully planned.

Supplementary Feed

A full milk supply is not available until September, so the first litter should be farrowed about the end of June if the piglets are to receive the increasing milk supply at the right age. This then brings the second farrowing to early January. It is with the second litter that the chief difficulty lies, for the milk supply drops rapidly from the end of March or mid-April when the pigs are only about twelve weeks of age. In this period the farmer will obtain the full benefit of carrots, grain, and meatmeal, for provided the pigs are getting a little milk they can very readily be finished off to porker weights by feeding a ration of ½lb. to 1lb. meatmeal, 1½lb. to 2lb. crushed or steeped grain, and as many roots as they wish.

> The comparatively slow progress which has been made in pig production in Otago and Southland is due to climatic conditions, whey feeding, and mixed farming. In this article the writer outlines the methods by which the pig industry can play a more prominent part in supplementing the income of the farmers in these two provinces.

Throughout Otago and Southland insufficient attention has been paid to the housing of pigs. Good results cannot be expected in this changeable climate if pig houses are not warm and draught-proof. Pigs are susceptible to cold and the maximum benefit of feed is lost if the pig is kept in draughty, damp quarters. Pleurisy takes a heavy toll in Otago and Southland and this is directly due to inadequate housing.

Grazing Practice

Pigs thrive better when run under the open-air system, and here again the climatic conditions play a part. The small run—one chain by two chains—is not generally satisfactory in Otago and Southland because of the loss of grass through the pugging of the ground. It is desirable to give the pigs more scope to graze and good results are being obtained by running them in the cow paddocks. However, this practice is not satisfactory in wet, cold weather, and it is much better to adopt a system of controlled grazing.

Such a system calls for a house with an attachable pen. If the pen has a wooden floor, and both pen and house are on skids, they can be readily moved to any part of the farm. In wet weather the pigs can be kept in the pen and grazed for about two hours a day, in which time they will have had sufficient exercise and grass to maintain good bodily health. In fine weather the pen can be detached or the door left open to allow as much grazing as desired.

By these methods the climatic conditions can be satisfactorily overcome.

Whey Plus Meal

Whey feeding has not been satisfactorily understood in the South. Many dairy factories are being supplied by

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2000 cows and more from which only a few gallons of whey per day are being utilised by the suppliers. The balance of the whey is being allowed to run to waste. When the farmer realises that good results are to be obtained from whey feeding he will find that he will make upwards of £2 in pig-flesh per cow. Whey must be fed little and often—say, five times per day—and only sufficient at a time so that it will be cleaned up in about 20 minutes. Whey in itself is not sufficiently balanced and must be supplemented by meatmeal and grain. The ideal proportion is 1lb. of meal to six gallons of whey. In this ratio the meal doubles the feed value of the whey.

Mixed farming is the next question to be dealt with. Large numbers of farmers milk 10 to 12 cows, grow cereals, small seeds, roots, and run a fair number of sheep. For some years past labour has been scarce and this type of farmer endeavours to handle his place without assistance. He thus has little time for pig production. His cows are a sideline, and pigs are a sideline to a sideline. He prefers to buy two or three weaners to fatten for his own use and he usually pays too high a price to make them a commercial proposition. This type of farmer has all the feed that is necessary for pig raising growing on his property, and by keeping even two sows, could make a reasonably good profit from them.

Feed Available

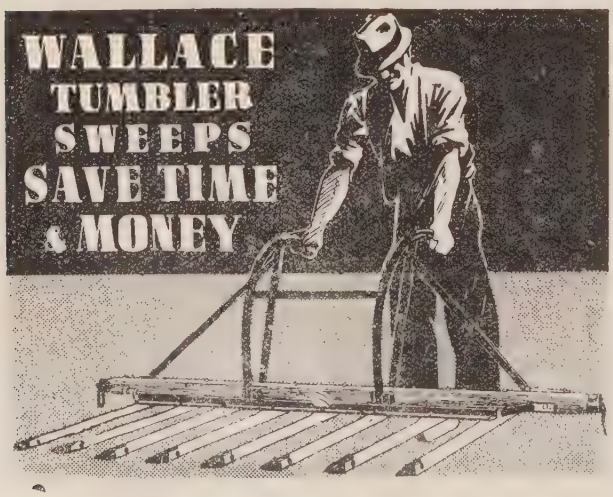
The lack of interest in pig raising in Otago and Southland is due to the fact that the general management of the pig has not been understood or put into practice, but with a better appreciation of these factors, the industry should flourish in this territory. The chief consideration is the amount of cheap feed available. The major dairy produced is cheese, so the pig raiser has to rely on whey as his cheap feed. Grain and roots can be produced at a reasonable cost as supplementary feeds.

The amount of whey food produced, less the amount used for the making of whey products, milk or casein, is 5871 tons, while the buttermilk is 356 tons and skim milk calculated from this is 5338 tons, making a total of 11,565 tons of feed from dairy by-products.

On March 31, 1938, the sow population of Otago and Southland was 4638 sows. If half these sows are used for producing porkers and half for baconers, as would be the case if the spring litters were made into baconers, and the autumn litters to porkers, the sows and litters would consume 23,190 tons of feed per year. This is calculated at six tons feed to feed a sow and her two litters of seven piglets to bacon weights and four tons feed to feed porker weights. With 11,165 tons dairy

HAYMAKING... (2) needs speed

The Farmer's main problem during haymaking is how to do the job efficiently in the minimum time. In this fight against time the WALLACE TUMELER SWEEP—strongly constructed and expertly designed for utmost speed—has proved its sterling worth. Perfectly balanced, exceptionally simple in operation, this splendid Tumbler Sweep works cleanly and quickly, handling heavy loads with ease. Manufactured in 8ft. and 10ft. sizes, with reinforced angle iron bar and strong hardwood teeth, the Wallace Tumbler Sweep takes all the anxiety out of haymaking and stands up to the hardest use.



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Milk free from bacteria — thanks to Speedway *Steam* Sterilising.

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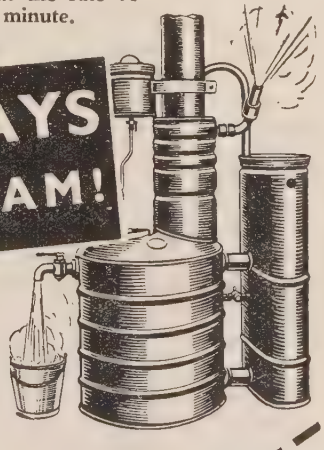

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by-products available the balance 11,625 tons feed must be made up with meatmeal, grain, turnips, grass, etc.

Two Litters Per Year

The number of pigs slaughtered in registered slaughterhouses for the year ending March 31, 1938, was 33,364. Add to this, say, 5000 pigs killed on farms, and we have a total of 38,364 pigs reaching marketable weights. It is reasonable to suppose that the sows in Otago and Southland can produce the New Zealand litter average of seven pigs per litter twice yearly and the 4638 sows in the territory should be capable of producing 64,932 pigs. The difference between the number of pigs capable of being produced and those reaching marketable age is 26,568.

It would appear that the farmers of Otago and Southland are not taking the fullest advantage of the capability of the sows to produce two litters per year. By planning the farrowing periods to fit in with the feed supply there should be no difficulty in greatly reducing the present discrepancy. No doubt disease accounts for a proportion of the difference, but practically all the diseases in this territory are preventable by better management. By far the most prevalent trouble is pleurisy, which is due to lack of shelter and draughty houses.

Definite Interest

Although in the past the pig industry has not been taken very seriously in this territory, lately a definite interest has been taken in this profitable sideline. In the last twelve months a large number of pedigree boars and sows have been purchased by Otago breeders from the North Island and Canterbury, and as soon as the progeny from this stock is available, a rapid improvement in quality should be evident throughout Otago and Southland. With the Government sow recording service available and tattooing for carcass quality, it should not be long before the farmers will be able to cull all undesirable and unprofitable sows from their herds.

While this should greatly assist the quality of the stock reaching the market, an improvement will have to be made to the general management of the herd if maximum results are to be obtained. These results can only be attained by paying an equal amount of time and thought to the pigs in proportion to their earning ability.

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For labour and material in average hill-country fencing. **£50** per mile.

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For labour and material in average hill-country fencing. **£250** per mile.

You can subdivide even in hill-country at a cost of only £50 per mile with a Prime Electric Fence whereas ordinary 6-wire fencing costs £250 per mile. And this is for PERMANENT electric fencing . . . for an electric fence that will last as long as the best ordinary fence you can build. Read the sensational article by Mr. C. S. Brook in this issue. Mr. Brook employs a Prime Electric Fence and his information on costs and construction is complete and indisputable.

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The Prime is the most reliable, most modern and safest electric fence controller ever made. In every detail it is constructed for flawless operation and a life-time service. It gives you such exclusive features as special oversize transformer, non-carbonising, non-corroding nickel silver contact points, moisture proof moto-chopper with compound interrupter which eliminates all possibility of current flowing continuously. The Prime is portable and absolutely safe to man or beast. No wonder it is the largest selling electric fence in the world. No wonder over 2,000 New Zealand farmers are using the Prime. Don't accept cheap substitutes; there is no substitute for the Prime.

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MR. C. S. BROOK, TE KUITI, writer of the article in this issue on sub-division with the Electric Fence, employs a "Prime" Controller. Read the article! Get the facts!

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ABRAHAM & WILLIAMS LTD.,
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Fig. 1.—Showing effective subdivision with an electric fence.

Value Of Electric Fencing

New Possibilities For Closer And More Economic Subdivision

Contributed by C. S. BROOK, Te Kuiti.

IT IS not the intention of this article to deal with the value of fencing as a farm principle or its corollaries, stock management and rotational grazing. Rather is it to bring to the notice of farmers a new principle in fencing which opens a new era in the economic subdivision of farm lands.

In a high rainfall country such as ours the King Country, in which the percentage of hill country which we have come to term "marginal" is high, we are faced with a huge problem of "reversion" due to second growth. The difficulties of pasture management in the large pastoral areas affected are intimately bound up with the principle of subdivision into paddocks and the resultant control by stocking.

The building of fences is today one of the problems facing the farmer on all types of farms because of a number of factors:—

(a) Exhaustion of fencing timber on the farm.
(b) High cost of in-brought materials.
(c) High cost of labour.
(d) Contour of country and resultant physical difficulties, not only in building the fence, but also in placing material on the line.

Electric fencing opens up a new possibility for closer and more economic subdivision. This is the opinion held by a prominent Te Kuiti farmer who has experimented extensively with electric fencing and who describes here his experiences and method of constructing the fencing.

Closer Subdivision

Thus, electric fencing opens up a new hope for closer subdivision. Science has, as she so often does, found us a substitute for the old just as the natural resources are exhausted. How many farmers who ridicule the application of science in their work stop to think what debt they owe to the chemist and his test tubes? He has saved us when things have looked blackest. Refrigeration, home separation, and fertilisers are concrete examples of the help the research man has given us.

No matter what the type or size of holding, electric fencing has some application on the farm and can be used to great advantage.

Cheapness and saving in time are its two greatest advantages. Whether you run cattle or sheep, pigs or milch cows, the electric fence will do the work. Whether you use it exclusively to subdivide your holding, or use it for temporary turnip breaks only, or for fencing a treacherous drain or tortuous creek, the electric fence will hold your stock as well as the best seven-wire fence ever built.

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BUT IT MUST BE WELL BUILT.

Do not think you will get results if you build a make-shift job. Do not think that one wire will hold sheep. The failures one hears about are due to faulty construction.

So satisfied were we after experimenting that we subdivided a block of 103 acres into 16 6½-acre paddocks, which involved 280 chains of electric fencing. The original experiment included the complete surrounding of a hay paddock with the electric fence. Although sheep and cattle were grazing on all sides not one passed the barrier.

The passage of time proves the fence an unqualified success. This block includes easy to steep country, which was in a rough, deteriorated state when taken over fifteen months ago. The subdivision into paddocks has been the greatest factor in crushing and stock control. Stock comprised breeding ewes, lambs, and Polled Angus cattle.

Construction of Fence

The following is a description of the fence:—

Wires.

Three wires must be used and they must be barbed. They should be of 12 or 14 gauge x 6. There is no objection to 14 gauge giving 700yds/cwt as against 450yds No. 12. The heights of the wires from the ground are 6, 16, and 38 inches. All wires must be completely insulated.

Posts.

(a) Strainers or End-Posts.—The term "end-post" is more correct, as there need be no straining of the wires. The function of posts in this type of fence is merely to act as a support for holding the wires at a uniform distance from the ground. The wires must be taut, but no staying of the end-posts is necessary. Simply use a good heavy post, well rammed.

(b) Intermediate Posts.—Intermediate posts may be either light posts or steel standards, costing £8 10s per 100. We prefer the Y-shaped standard, which is quickly driven into the ground by means of a cap and maul. These are suitably drilled, and should be driven until the lowest hole is at ground level. No footing in dips is necessary unless the soil is light. In coastal districts the galvanised standard is recommended, as it will give a longer life.

(c) Angle Posts.—Angle posts are wooden posts or standards tied back, but wooden posts, if well rammed, need

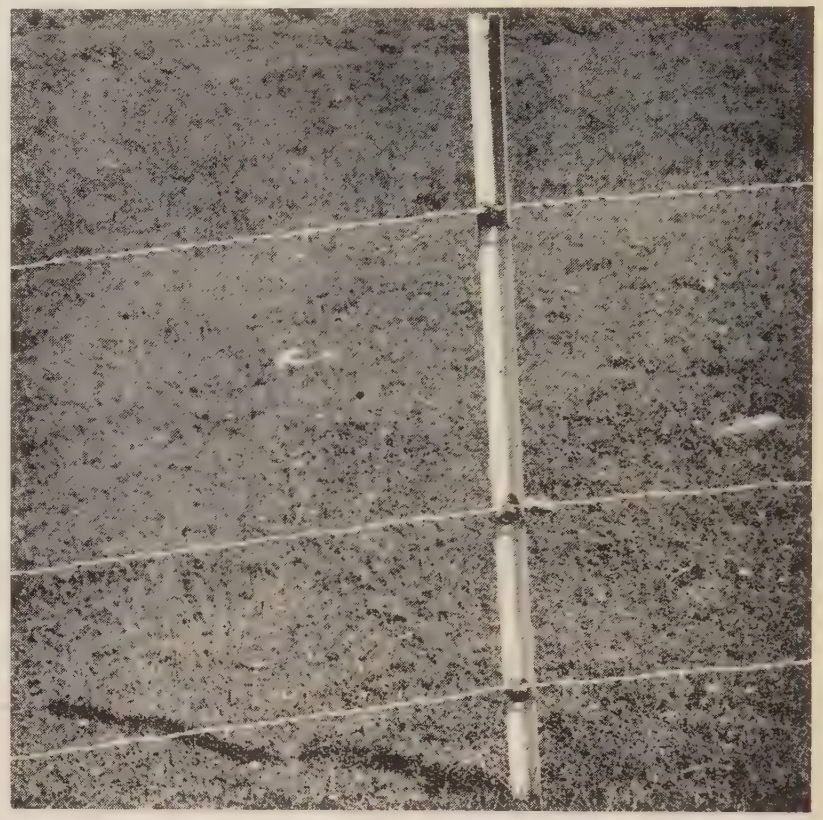

Fig. 2.—Showing the steel standard used and the method of attaching the wires to insulators bolted to the standard. The wires are 6in., 16in., and 40in. from the ground.

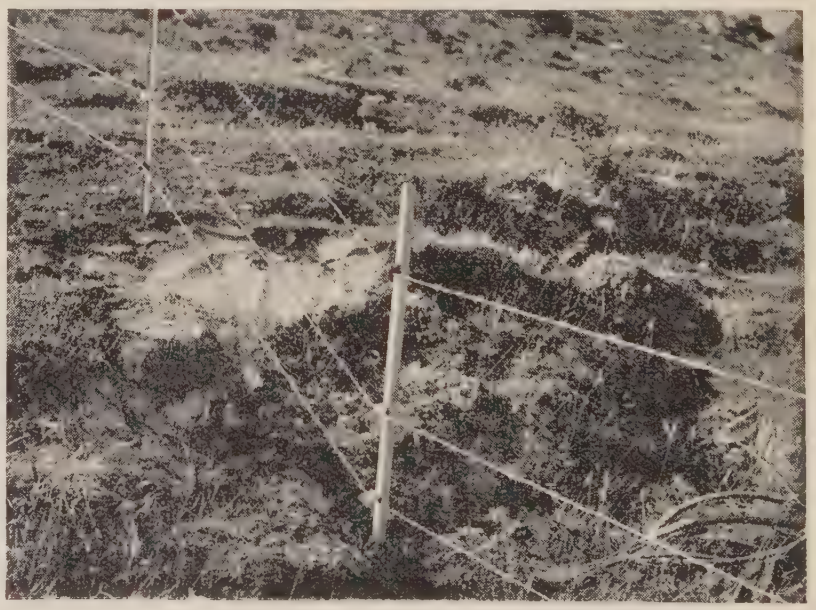

Fig. 3.—A typical view of the fence line. No footing is required in the dips. The posts are spaced to keep the lowest wire at a constant 6in. from the ground.

not be tied unless the angle is less than 135 degrees. The spacing of the posts depends on the contour. Use sufficient to keep the bottom wire a constant six inches from the ground. The number will vary from two to five per chain, depending on the contour of the traverse.

(d) Ties in Dips.—In dips we use a tie instead of a post. The accompanying diagram will illustrate the method. These consist of a buried foot with wire and insulator (see illustration).

Insulators

All wires must be completely insulated to eliminate "earthing," and insulators at both ends and at each intermediate post are necessary. The insulators used are of two types:—

(a) Egg insulators, costing 12/- a gross, are used at the ends to attach the wires to the end-posts or strainers (see illustration). A similar arrangement is frequently used on a wireless aerial. These insulators may also be used at sharp angles.

(b) Cup insulators, costing 14/- a 100, are used at intermediate posts. The method of attaching cup insulators is as follows:—(1) With wooden posts, the insulators are nailed to the posts with a leather washer between the head of the nail and the insulator. (2) With iron standards the insulators are bolted on, using 3/16 x 2in iron bolts. Place a large washer made of two thicknesses of rubber inner-tube between the insulator and the standard. Screw up tightly. This rubber washer takes up winter contraction. Dip the bolt in good rust-oil before use. This allows the removal of the bolt if it is desired to take off the insulator. Bolts cost 7/6 a gross.

Attachment of Barbed Wire

Use binding wire and tie tightly. In the dips the barbed wire will pass under the insulator, and on the rises it will pass over the insulator. When completed, the fence presents an attractive appearance (see illustration).

Controller

One controller will enervate fifteen miles of wire. Thus, with a three-wire fence the length of fence line served will be five miles, or 400 chains.

The charge is intermittent, and although of a high voltage this intermittancy renders the charge harmless.

Fig. 4.—A steep traverse. Grades or contours make no difference to this fence.

Fig 5.—Another view down a steep rhyolite hillside. To fence this with the old type of fence would have presented an expensive problem.

The power is supplied by a 6-volt battery, wet or dry. A transformer steps this up to 110 volts. Using an ordinary car accumulator the annual cost of power will not exceed 10s. We are using a trickle charger to boost up the accumulator occasionally, and this brings down the annual charge to approximately 3s. A trickle charger will cost £3 17s 6d.

Discharge takes place only when the wires are "earthed," such as by stock making contact. Other than this the only drain on the battery is in the driving of the "make and break" chopper.

In choosing a controller see that your choice falls on one with the following fittings:—

(a) Dial showing condition of insulation, i.e., indicating partial or complete faults on line.
(b) Lamp which flashes on development of fault.
(c) Variable strength of shock.

Advantages of Electric Fence

The advantages of the electric fence are:—

Fig. 6.—**The hay paddock, with lambs grazing on the aftermath. Note the close grazing on the near side of the fence. Cattle and sheep graze right up to fence, but not through it.**

(1) Low cost of material and erection; no strainers; fewer posts; no battens; lighter wire; and only three wires as against seven in standard fence. No footing in dips; little staying necessary. Material and labour will not exceed 7s a chain. Saving in weight of material a big factor where packing is necessary.

(2) Low upkeep cost; 10s a year will cover all charges. No wear and tear on fence as stock will not touch it. No staples to work out; no battens to shift.

ELECTRIC FENCING

YOUR BEST INVESTMENT IS THE ORIGINAL
(COBURN) ELECTRIC FENCE

BECAUSE: It is entirely **reliable.** Operated from a 6-volt battery, the current is sufficient to charge a 10-mile fence for **three to four months,** and under all conditions . . . It can be erected at a **fraction of the cost** of ordinary fencing, and pastures can be changed from time to time at a minimum of trouble and inconvenience. For intensive sub-divisional work it is unrivalled . . . It is singularly **durable.** The Controller is built especially for hard farm usage, and **will last indefinitely.** There are no delicate parts to wear out or replace.

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Fig. 7.—Left: The one wire, carried high on standards, carries the power from the nearest electric fence to the one which surrounds the stack. *Right:* A tortuous fence following a dirty swamp. Straight lines are not essential and angles no disadvantage. Old fencing posts which were handy have been used here.

(3) Greater flexibility in erection. Fence-line can zig-zag with creeks or drains. Ideal for turnip breaks, crushing dirty areas, temporary pastures, hay paddocks, and fencing stacks. Stock will graze right up to fence line without fear.

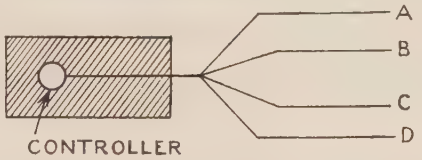
(4) Stock respect fences. Sheep and cattle become accustomed to new fence immediately. Stock move through gates without demur.

Gateways

Whatever type of gate is used, the overhead method of taking the power over the gateway is used. The illustrations show the types of "Taranaki" gates we have in use—(a) Ordinary "Taranaki" baton and wire (not charged); (b) electrically charged. Very simple to build and 100 per cent. effective; three wires and no battens.

Faults in Lines

Faults in lines show in the form of a short-circuit, and are indicated by a lamp flashing on the panel of the controller. Faults are generally due to—



(a) Broken insulator; (b) something falling on line, e.g., tree, etc.

To facilitate detection of faults we have sectionalized our fence lines, and by "differential diagnosis" can tell in a moment by the elimination of one section after another on which section the fault lies. This avoids the necessity of patrolling all the lines in search of the fault.

Let us suppose a fault develops on fence D., causing the lamp on the controller to flash. Then proceed as follows:—

Disconnect at A.—Light still flashes.

Disconnect at B.—Light still flashes.

Disconnect at C.—Light still flashes.

Disconnect at D.—Light does not flash. Therefore the fault is somewhere along the line served from D.

This system eliminates the need to patrol the whole system.

After a short time one can tell without looking at lamp whether there is a fault on line or not. This obviates having to go back to controller to check things over.

Fig. 8.—Left: A gateway with a simple electrified gate. The high wire takes the power from one fence to the other over the gateway. The gate wires are electrified, but the standards at each end are insulated. *Right:* A gateway with the usual "Taranaki gate" (not electrified). Note the power line above the gateway taking the power from one fence to the other.

The fault can thus be narrowed down to a few hundred yards and so quickly located.

Other Considerations

The double fencing of drains and shelter belts always presents a problem. The wear and tear on any fence not evenly grazed on both sides is especially heavy, due to stock pushing through to get the longer rough feed. This is completely eliminated with the electric fence. Stock will graze up to but not through it. This is a big consideration in the fencing of drains, shelter belts, and hay paddocks.

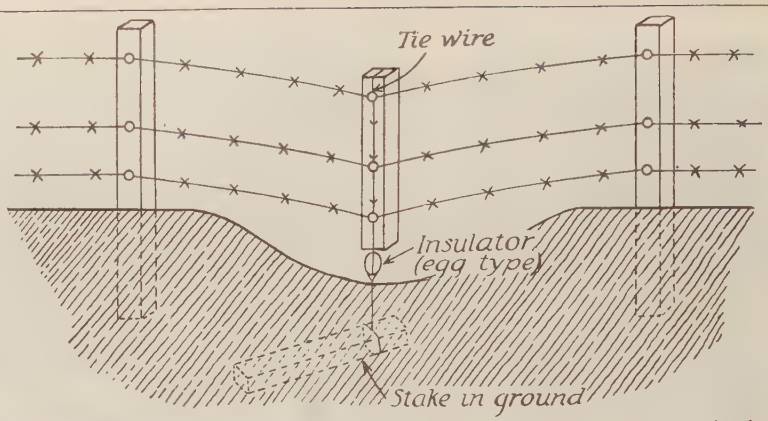


Fig. 9.—A diagram of the method of carrying the fence over dips in the land.

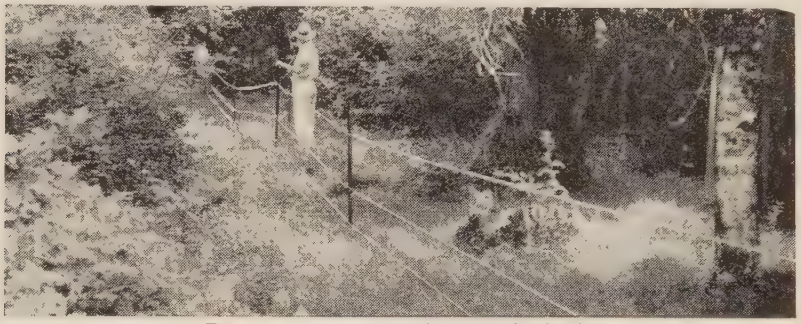
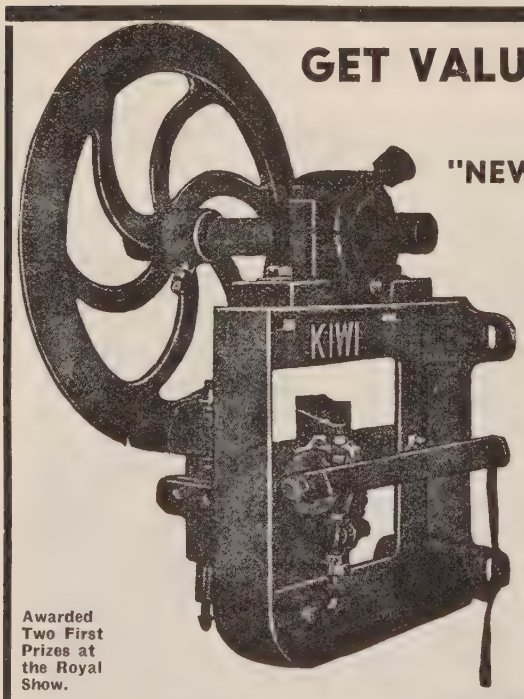


Fig. 10.—A traverse through the bush.

In the crushing of bracken fern with cattle we would suggest that in the first place one wire at 36 inches will do the work of holding the cattle. When the land is ready for sheep add the two bottom wires.

Should any reader require additional information we shall be pleased to answer any inquiry.



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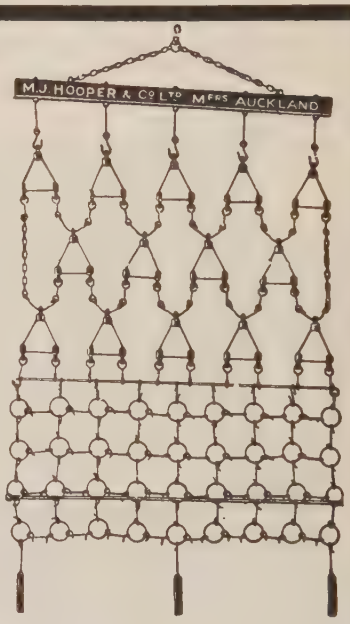

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Record Of "All Grass" Waikato Farm

Fig. 1.—Showing the close subdivision and well-sheltered fields.

Butterfat Increase From 123 To 278 lbs. Per Acre In 14 Years

W. T. BROWN, Instructor in Agriculture, Hamilton.

IN 1924 Mr. Diprose (senior) purchased his farm of 113½ acres near Matamata. During the 1924-25 season the farm produced 14,000 lb. of butterfat; production has increased each season, and in the 1937-38 season the farm produced 31,500 lb. of butterfat.

Over the last five years the farm has been managed by Messrs. W. J. and J. A. Diprose, sons of Mr. Diprose (senior). The herd average is 383 lb. of butterfat per cow and 278 lb. per acre, so that this farm is in the first rank of high producing dairy farms.

The New Zealand Agricultural and Pastoral Statistics 1936-37 show that, out of 19,307 dairy farms, only 186 farms produced more than 275 lb. of butterfat per acre, e.g., less than one per cent.

Compared with these figures, Mr. Diprose's production of 278 lb. of butterfat per acre is very satisfactory, and shows that there is room for improvement on most dairy farms.

An increase of 125 per cent. in the production of butterfat within 14 years is the record of this "all grass" Waikato farm. For the last five years this herd has been top of the herd-testing group with an average of 383½ lb. of butterfat per cow. Similar figures could be attained by many other dairy farmers if some of the methods were incorporated into the management of the lower-producing farms.

Soils

The soils of the Matamata plains consist of alluvial deposits of pumice sands and rhyolitic gravels overlaying deep beds of consolidated pumiceous sand and surrounded by deposits of heavy clayey soils nearer the foot of the hills. The soils are chiefly sandy loams, varying from coarse to fine, and are very similar to the soils of the Horotiu series. They are friable, easily worked, well-drained soils which seldom pug in the winter and are warm and dry even under wet conditions.

These soils, like those of the Horotiu series, respond well to phosphates and show slight responses to potash and lime, and, when well managed and suitably manured, carry excellent pastures.

Climate

This locality is favoured by a rainfall of approximately 50 inches annually. This is distributed fairly evenly throughout the year. The rainfall towards the end of the winter is usually fairly heavy, and good rainfall continues up to Christmas, after which hot, dry weather is experienced until late in February, when a return of the rain occurs.

As the autumn passes, conditions become gradually cooler. In winter months some heavy frosts occur; this checks pasture growth and retards the starting of the spring growth.

Shelter and Subdivision

When the farm was purchased there was very little shelter, and the farm was divided into three large station paddocks. These have been subdivided into 19 small fields each of from two to 14 acres, and wind-proof hedges planted around the smaller fields.

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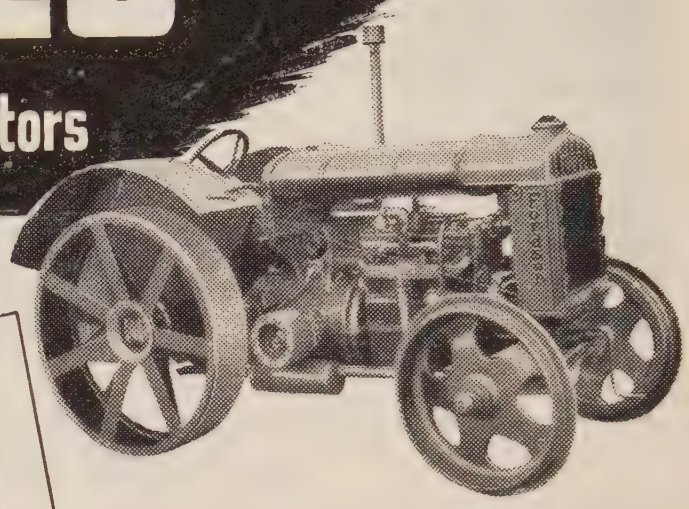

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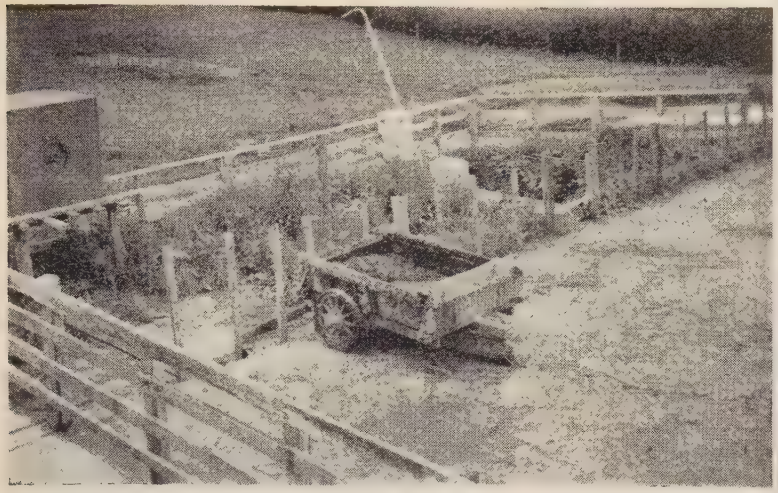

Fig. 2.—Above: A corner of the cowyard showing the trolley for carting out solid refuse, the tank on the stand for carting out liquid manure, and the centifugal pump and drainage sump in the background. *Right:* The centrifugal pump in action.

The older wind breaks are of *Pinus radiata*. These trees are now large and open at the base, but as each field has been fenced with barberry or *Cupressus Lawsoniana* they still provide good tall shelter.

Topdressing

As would be expected, such remarkable increases in production have gone hand in hand with heavy topdressing. Twenty tons of carbonate of lime are applied each autumn at the rate of 3½ cwt. per acre. Superphosphate at 2½ cwt. per acre is applied in April, and another dressing of 2½ cwt. in early spring to ensure sufficient supplementary feed.

Potash is also used, but in lighter quantities. Four tons of it are purchased each year, and this is applied at 1½ cwt. per acre to a certain number of fields. The fields are topdressed in rotation, a little under half the farm being topdressed with potash each year.

Together with the fertilizers, all animal manure, both solid and liquid, is collected from the cow shed and pig pens and distributed over the farm. A 3,000 gallon sump collects all washings from the cow bails, and a 1,900 gallon sump collects the pig-yard washings. These two sumps hold all liquid refuse accumulated in a week, and 4,900 gallons are spread over 2½ acres each week. The liquid dressing shows good growth responses, and in the opinion of the farmer is equal to a dressing of 2 cwt. of sulphate of ammonia.

The liquid manure is distributed with a 400 gallon tank on a motor lorry, and is lifted from the sump with a centrifugal pump. The solid manure collected is carted on to the fields and evenly distributed around the farm.

This utilization of waste, which originally drained down a small gully, killing trees and hedges crossing the seepage, has saved the trees and hedges and also eliminated a small lagoon in a lower field, where the shed waste had blocked the porous subsoil.

Supplementary Feed

As the land is well drained, pits are used to store most of the supplementary feed for winter. Forty acres are cut each year for silage, and all surplus feed, toppings and Californian thistles are saved. Although these do

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Fig. 3.—The herd.

not make first-class silage, the farmer contends that they are better saved in the bottom of the pits than wasted in the fields.

Only a small quantity of hay from about ten acres is saved. This, together with the silage, carries the stock over the winter and other lean periods.

Stock Carried.

This is not a farm on which butterfat production takes precedence over all other branches of farming. Most cows on the farm have been bred by the owner, and the herd is a mixture of purebred Jerseys, Shorthorns, Grade Jerseys and Jersey-Shorthorn cross cows.

This season 94 milkers and 40 head of dry stock were wintered, and up to December last year production was well up, although a little lower than the last two seasons due to the cold, wet spring and retarded spring flush. During the milking season about 95 pigs are reared to bacon weights on whey.

When this farm was visited in December all stock were in good condition, and, considering the vagaries of the season, feed and supplementary crops were further advanced than on most farms in the district.

Pasture Management

A feature of every programme carried out on this farm is the utilization of all surplus or waste produce. All fields are topped whenever they get away from the stock and, as mentioned previously, all toppings are saved. Fields are grazed in rotation, and no special fields are kept for night paddocks. The cows spend one day or one night in each field, and the fields are fed off in rotation.

Mr. Diprose does not believe in hard grazing; his idea is to control all grass and keep his feed in the leafy stage, 3in. to 6in. long, as far into the season as possible.

Fields which are to be cut for ensilage are closed in the spring as early as they can be spared and cut whenever they have attained sufficient length; the same procedure applies to fields closed later in the season. During the flush of spring growth, instead of adopting the usual practice of closing fewer fields and taking heavier crops and buying in stock to cope with the surplus growth, this farmer takes lighter crops from more fields.

Records.

Production 1924—14,000 lb. of butterfat.

Production 1938—31,500 lb. of butterfat.

This is an increase of 125 per cent. in 14 years.

For the last five years this herd has been top of the herd-testing group with an average of 383½ lb. of butterfat per cow.

The production over the whole farm is 278 lb. of butterfat per acre. This is very good when it is remembered that all milking cows and stock for replacements are carried over the season and also wintered.

Summary

These figures may seem very high to many farmers, but similar figures could be attained by many other dairy farmers if some of the methods in use on this farm were incorporated into the management of the lower-producing farms.

A feature of high-producing farms which is very striking is the attention given to the smallest details. On this farm, gates and fences are in good repair, driveways out of silage pits are metalled, and all stock and farm implements are in first class order.

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Causes Of Poor Pastures—

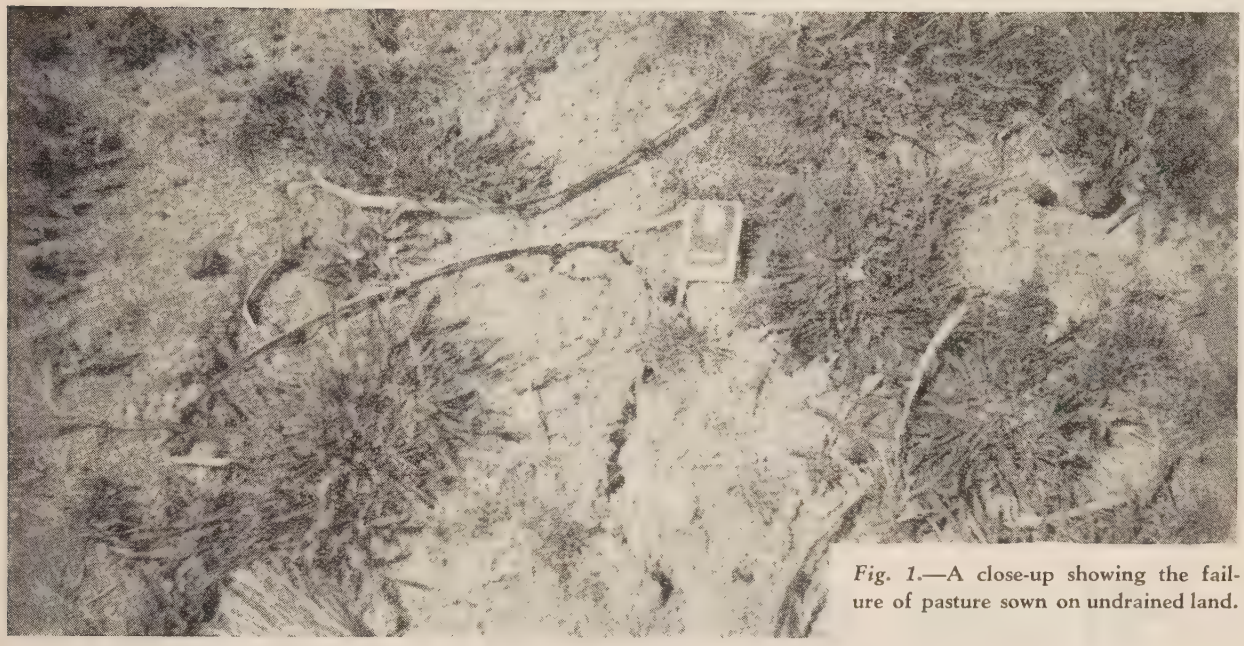

Fig. 1.—A close-up showing the failure of pasture sown on undrained land.

Faults Which Have Resulted In Poor Production On Fertile Land In North Auckland.

E. H. ARNOLD, Instructor in Agriculture, Dargaville.

ON MANY farms the establishment and maintenance of highly productive pastures has now reached a high standard. In spite of the success achieved by many farmers, poor pastures are too often found—initial establishment is a failure, the pasture deteriorates rapidly after a short period of fairly high production, or an otherwise good pasture fails to produce an abundance of milk-producing or fattening feed at all growing periods of the year. Instances such as these do occur.

While it is not claimed that the following causes are the only reasons for the faults enumerated above, they have been found to bring about poor production on fertile land which is capable of high yields.

In spite of the success of many farmers, poor pastures are too often found. While it is not claimed that the reasons enumerated are the only causes of poor pastures in the North Auckland district, they have been found to bring about poor production on fertile land which is capable of high yields.

Lack of Drainage

Fig. 2 shows an area on the rich alluvial river flats of the Northern Wairoa District. In the autumn of 1937 this field was worked up to an excellent seed bed, and a mixture which could be described as entirely suitable for this class of country and costing somewhere between £2/10/- and £3 per acre was sown. The photograph was taken in the spring of 1938, while that in Fig. 1 during January, 1939.

The pasture is a rank failure. The sown grasses and clovers have failed to establish, and rushes are now plentiful. During the dry summer the soil has dried out and cracked open, and the paspalum is not particularly vigorous. The soil is quite capable, with very little topdressing, of carrying that high-producing pasture consisting of ryegrass, paspalum, and white clover.

Failure to obtain a pasture sward is entirely due to lack of adequate drainage. The area lies very wet in the winter, and has been subject to periodical flooding. Rich soil, good cultivation, adequate fertilisers, and the best of seed have been wasted, and all because the excess water has not been removed from the soil.

The maxim is to provide adequate drainage.

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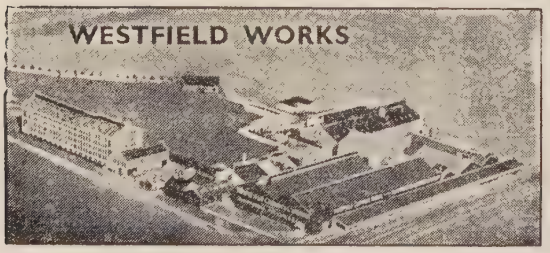

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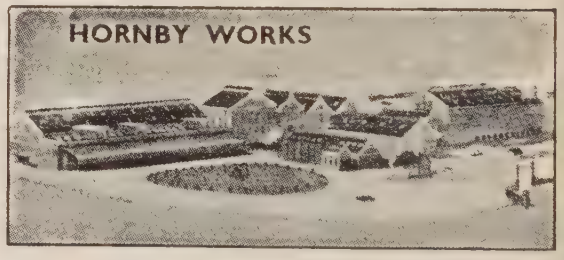

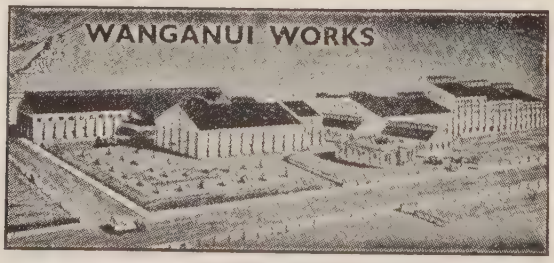

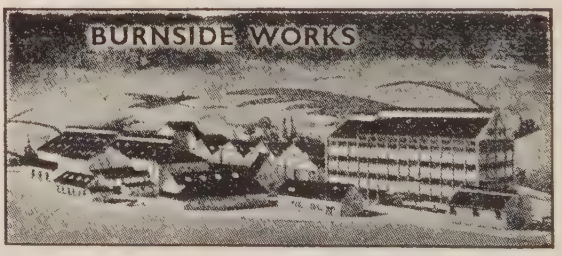

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It may be an idle statement to say that white clover seed should be included in the pasture mixture to be sown down, but in certain districts some farmers are of the opinion that sufficient seed of white clover exists in the ground, and that in time the "volunteer" plants will provide sufficient white clover in the sward. Therefore, they contend, it is unnecessary to include this species in the seed mixture.

Fig. 3 illustrates a close-up of a pasture where the farmer considered that "volunteer" clover would be sufficient and did not include white clover in an otherwise excellent seed mixture.

Fig. 2.—**Failure of pasture sown on undrained land. (Photograph taken spring 1938; pasture sown down in autumn 1937).**

For a season or two before the clover developed the pasture produced poorly, and the ryegrass, which did not thrive, began to die out. However, the "volunteer" white clover came in, and twelve months prior to the date on

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Fig. 3.—Pasture sown without including white clover in the seed mixture.

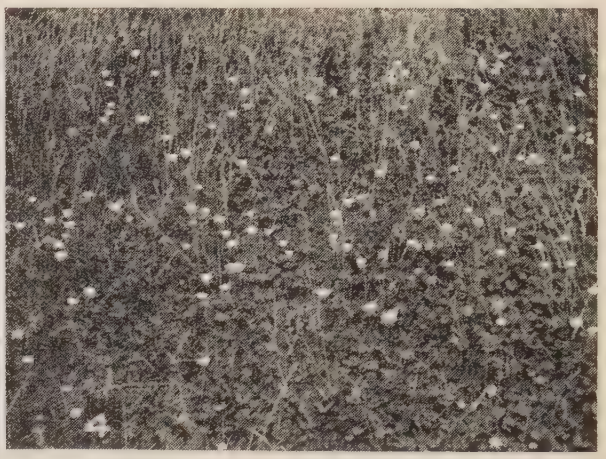

Fig. 4.—Pasture sown with white clover included in the seed mixture. (Photograph taken in field alongside that in Fig. 3).

which the photograph was taken the sward contained such an excess of clover that dairy cows could not be grazed in the field without being "bloated."

Observations revealed that the white clover was an annual; it gave all of its production in a short burst of two to three weeks' duration. Being an annual, it depended upon reseeding for its continued existence. It was not persistent, and the sward now contains little or no clover, with poorly growing ryegrass, which is again thinning out.

Contrasting Field

In an adjacent field in which certified white clover was included in the seed mixture the pasture sward presents a remarkable contrast. Highly productive pasture with adequate clover resulted, as shown in Fig. 4, which was taken on the same day as Fig. 3. At that time the pasture was slightly clover dominant, due to the time of the year when ryegrass goes off under the northern conditions. The pasture is dark green, and produces with the ryegrass an abundance of milk-producing feed.

The maxim, therefore, is not to rely on volunteer white clover, most of which is of a poor annual type unsuited for permanent pasture, **but to sow white clover, using certified seed.**

Need for Paspalum

During recent years a tendency has existed to simplify pasture seed mixtures. Under certain conditions a mixture of ryegrass and white clover has produced a highly productive pasture. In most districts, however, the addition of other grasses, such as cocksfoot, timothy, and crested dogstail, has given a pasture which is better balanced in constituents and which yields feed for longer periods of the year.

Under North Auckland conditions paspalum has become the dominant constituent of most pastures. The ryegrass, although producing well during the autumn, winter, and spring, fails during the drier months of the summer. If paspalum is also found in the sward this grass, together with the white clover, carries the production through the summer months. If the paspalum is lacking after the ryegrass goes off the white clover then takes charge of the sward. This is shown in Fig. 5, a photo of a four-year-old pasture which was obtained by sowing ryegrass and white clover only.

This field, with the superabundance of white clover in the summer, has given the farmer much trouble and worry. Although ample growth is

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present, he is unable to graze the area with his dairy herd without numerous cows suffering from "bloat." Before being sown down this field had been cropped with maize for some years, and all the volunteer paspalum had been worked out. The inclusion of paspalum would have produced the ryegrass-paspalum-white clover pasture, which would have given better balanced feed for dairy cows throughout the year.

Although most farmers consider the sowing of paspalum unnecessary in North Auckland, this is one of the instances where good ryegrass and white clover seed alone has been used and the regeneration of paspalum into the pasture sward has not occurred. On such rich land as the Northern Wairoa River flats the ryegrass-white clover pasture cannot produce the annual feed which is obtained from the ryegrass-paspalum-white clover pasture.

The maxim, therefore, is to sow paspalum seed with the mixture in North Auckland if volunteer paspalum does not come rapidly into the pasture sward.

Fig. 5.—Pasture obtained on the Northern Wairoa Flats by sowing ryegrass and white clover only. (Photograph taken January, 1939).

Seed Wheat Certification

Contributed by the FIELDS DIVISION.

THE following is a list of growers whose wheat crops have passed both the field and grain inspections as required under the Government scheme for the certification of seed wheat. The seed from these crops is not recognised as finally certified until it has been satisfactorily machine-dressed and the sacks suitably tagged and sealed. A previous list of growers appeared in the March, April, and May issues of the "Journal," and further lists will be published later.

Variety	Grower's Name and Address.	Acreage.
Cross 7:	Beck, James, Kauru Hill 14d R.D., Oamaru	8
	Carrig, John, Totara 17c R.D., Oamaru	7
	Christie, A. J., Toiro	6
	Gibson, S., Duntroon	10
	Henderson, W. L., Teschmakers, Hunter R.D., Waimate	23
	Michelle, E. G., Wyllies Crossing	18
	Sherratt, N., Geraldine	30
Dreadnought:	Beck, James, Kauru Hill, 14d R.D., Oamaru	30
	Cooper, W., Kakanui	30
	Gregan, J. D., Hunter R.M.D., Waimate	10
	Kerrin, J. M., Enfield 1c, R.D., Oamaru	20
Hunters:	Cowan, C. J., Kia-Ora, 18d R.D., Oamaru	8
	Grant, A., "Gladfield" R.D., Mosgiel	10
	Marshall, W. J., Gleniti Tycho R.D., Timaru	14
	Morris, W. H., Orari Bridge, Geraldine	11
	Young, J., Snr., Allanton	25
Solid Straw	Benny Bros., Southbridge	20
Tuscan:	Kennedy, I., Georgetown 12k R.D., Oamaru	25
	Lyon, C. R., Kakahu Rd., Temuka	19
	Miller, Mrs. S. J., Mt. Hutt R.D., Rakaia	10
	Morrison, J. L., Morven (Line B)	16

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Improved Strain Of Cocksfoot

Establishment For Seed Production Purposes

A. H. FLAY, Canterbury Agricultural College, Lincoln.

The breeding of an improved strain of cocksfoot and its propagation has led to a study of methods of establishment for seed production under Canterbury conditions. This article describes the method of establishing cocksfoot for the production of clean, high-grade certified seed.

COCKSFOOT will grow on any class of soil but like all crops and grass it does best on good land. For profitable seed production the best soils are deep, free, silty loams that are not water-logged in winter, and yet do not dry out readily in summer. It is on this class of land that the highest seed yielding cocksfoot stands in Mid-Canterbury are grown. Any good soil that is not unduly wet in winter grows cocksfoot profitably. Soils that dry out rapidly, such as peat on shingle, are not good.

Most good soils in Canterbury today are heavily infested with weeds. Vigorous growing annuals are troublesome in the first year, but are of no importance subsequently. They die down once and rarely appear again in a permanent cocksfoot stand. The twitches, fog grass, rye grass, etc., permanently reduce the yield of cocksfoot seed and impair the purity of the seed sample. Machine dressing, no matter how complete, is not able to remove all rye grass. Commercially, rye grass and fog grass in the sample are the worst grasses. They cause heavy losses in machine dressing. It is therefore important to have clean land when sowing cocksfoot for seed production.

Preparation of Land

Where seed with a high purity is desired it is necessary to plan to sow cocksfoot a year or two ahead. Had this been done when propagating the improved strain now on the market much better results would have been obtained with a number of the stands. Several cleaning crops such as rape, greenfeed oats (not Italian rye grass), potatoes, turnips, or swedes, enable all twitches to be killed and many annual weed seeds to be germinated while carrying out a normal cropping programme.

In an attempt to accomplish what should normally take two or three years (i.e., up to five and six ploughings), ten and twelve grubbings, and numerous harrowings, intensive cultivation programmes, involving heavy expenditure, have been carried out over a period of six to eight months in order to approach a condition which could be readily obtained much more cheaply over a two years' period. The most profitable and cleanest crops have been obtained where the land has been clean before sowing.

Assuming that all twitches have been eradicated and all deep working completed then cultivation should consist of regular harrowings at intervals of a few days up to ten days, and perhaps a rolling or two over a period of six to eight weeks before sowing. This will compact the seed-bed, bring moisture to the surface, and germinate many of the weed seeds in the surface soil.

Where several strikes of weeds have been obtained before sowing in soil naturally fairly clean the quickest establishment of cocksfoot has been obtained. From a crop sown on clean land in February, 1937, there was harvested the following January just over 300lb of machine-dressed cocksfoot seed per acre. Other crops have yielded in about eleven months after sowing under these ideal conditions 286lb and 256lb of machine-dressed seed per acre. On the other hand where annual weeds such as hedge mustard, wild oats, etc., have been bad a hay crop has had to be taken the first year.

Method of Sowing

By drilling the cocksfoot seed and manure in very shallow on this firm, weed-free, moist seed-bed, a successful strike is assured. The drilling, however, can very easily be too deep. One half-inch cover to the seed is ample. Actually the seed and manure should be just covered and no more. If there is no seed and manure showing in the coulter mark then the seed is deep enough, if not too deep, and light harrowing or rolling should not follow drilling. If the seed and manure is sown so shallow that it merely falls into a mark scratched by the coulter but is not covered, then very light harrowing and rolling is recommended. The firmer the seed-bed the easier and safer is shallow drilling.

A few areas have been broadcast on similarly prepared seed-beds, but the advantages of broadcasting where seed production is the object are not yet evident. It appears that drilled-in stands will produce more seed in

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the first year and give just as good seed yields in subsequent harvests.

Manure has always been sown with the seed. Super and lime mixed or reverted super at the rate of 2cwt to 4cwt per acre have been used. Topdressing in the spring (five to six months after sowing) with 1cwt to 2cwt of ammoniated super has given payable results on all stands showing a paleness in the leaf in the early spring. On deep green and vigorous stands excess leafage appears to have been produced by such topdressing.

Seeding per Acre

Considerable variation has occurred in the seeding per acre. The heaviest quantity sown per acre was 15lb and the lowest (an error) 2lb. The heavy seeding was always good, while the lightest was too thin for the first two years. The third year (1939 harvest) was good. Good stands have been obtained from six, eight, and 10lb of seed per acre. The recommendation is that 8lb to 10lb should be sown. This seeding on a good, clean, well-prepared seed-bed will give a good crop in the first harvest. Germination of the seed sown ranged from 68 to 80 per cent.

Because of the desire to multiply this strain of cocksfoot rapidly, seed harvested in January was sown on well-prepared and fallowed seed-beds in February and early March. Some late March sowings were frost lifted. Sowing in early February seems desirable, and there is no reason why sowing should not take place any time from September to February. The usual weed problems on heavy land favour autumn sowing when cocksfoot is being sown alone for seed production.

Sowing With Other Crops

It has been mentioned that rapid propagation was the main reason for adopting the method of sowing described. Another reason was to ensure success from the sowing of a valuable and limited supply of seed. All stands sown in the manner described have been successful except one of ten acres, where the seed was completely buried in the drilling. About 50 per cent. of the areas were harvested for seed ten to eleven months after sowing, giving yields of machine-dressed seed varying from 50lb to just over 300lb per acre.

It might be mentioned that the high yield was from a 17-acre paddock in the Ashburton district, and was almost clean of annual weeds. Annual weeds were responsible for the low yields or were the cause of areas having to be cut for hay.

In only one instance was the cocksfoot sown with another crop—red clover. In the first year a crop of hay and then red clover seed was taken. The stand was allowed to go for cocksfoot in the second year, and yielded 386lb farm-dressed seed. Provided that cocksfoot seed is not aimed at in the first year and where land is not just as clean of annuals or rye grass as it might be, the method has much in its favour. Where hay is desired it might well be adopted. The seeding of red clover was about 2lb per acre drilled in with the cocksfoot. This method of cocksfoot establishment has been used by some farmers in Canterbury with good results. Sowing with certified white clover has not been tried, but should be worth consideration.

Other methods of sowing are with wheat or oats in the autumn, over these crops in the spring, or with spring-sown barley. There is usually a delay of a year or two after the grain crop is removed before cocksfoot seed is harvested. Often the strike is thin and weeds such as twitches, rye grass, and fog may be the cause of a thin stand.

As compensation for the delay in seed production and the invasion of some of the undesirable grasses there is the income from the grain crop and no heavy expenditure on cultivation. When sowing with a grain crop the seeding of cocksfoot might well be heavier than 10lb and the seeding of the grain crop could well be reduced to one-half of that normally sown. A light seeding of a spring-sown grain crop, especially barley, along with cocksfoot on a well-prepared seed-bed should enable good cocksfoot stands to be secured.

Rye Grass Problem

As mentioned earlier rye grass cannot be removed completely by machine dressing. It gives weight to a cocksfoot seed sample, but commercially it reduces the value. Certified pedigree cocksfoot does not contain more than 0.3 per cent. of rye grass, and Government stock seed has no more than a trace of rye grass in it. The importance of this can be realised when it is pointed out that if a farmer sows cocksfoot for seed production he does not wish to reap rye grass in the first year and have a cocksfoot stand which in subsequent years may produce seed containing a large proportion of rye grass.

With a seeding of 10lb of cocksfoot per acre containing 0.3 per cent. rye grass one is actually sowing one rye grass seed per square yard. Cropping for several years before sowing to cocksfoot is recommended on land now growing rye grass. Where it is hoped to harvest seed certifying at the pedigree grade this is most important. Rye grass of course can be hand-weeded out of establishing cocksfoot stands, but such work is laborious and costly.

The production of cocksfoot seed on the Canterbury plains is being steadily developed, and it is a profitable sideline on most heavy soils. During the last two or three years small areas of pedigree cocksfoot (College Strain C23) have been established in various localities with success. Some of these areas have given high yields of machine-dressed seed within twelve months of sowing date. The most successful method of establishment has been described in detail and other methods mentioned.

Prices For Butter Boxes

Amendment to Export Butter Box Pool Regulations

A. E. MORRISON, Solicitor, Department of Agriculture.

THE PURPOSE of the Export Butter Box Pool Regulations 1938, Amendment No. 1, is to modify the basis on which the prices to be paid to box-makers for boxes purchased by the New Zealand Dairy Board and by dairy factory proprietors for boxes supplied by the Board are to be fixed, and to provide additional administrative powers for the more efficient operations of the export butter box pool.

Accordingly, the regulations empower the Dairy Board to forward either nailed up or shook boxes to proprietors, and to require proprietors to supply the Board with monthly particulars of stocks of boxes on hand and an estimate of their requirements for the next succeeding month.

In past seasons the price paid to a box-maker has been based on his estimated timber price for the whole season. As the estimation prior to each season was subject to a considerable error and resulted in substantial adjustments having to be made after the close of the season, the amending regulations provide that monthly statistics of purchases of timber are to be submitted by box-makers, whose prices are accordingly being based at the commencement of the season on the value of their stocks, and adjustments are made during the season if their timber purchases render such adjustments necessary.

In past seasons dairy factory proprietors have purchased boxes either ex box factory or at some other fixed point in the case of boxes purchased from South Island box-makers for use in the North Island.

Freight Charges.

Provision is made that all sales to dairy factory proprietors shall be made on a delivered price basis. Accordingly, the regulations give the Dairy Board power to estimate the average freight payable on boxes purchased from box-makers, to add a freight charge to each type of box sold, and to apply the same freight charge to any one type of box, but to apply, if necessary, a different average freight to each type of box treating, if thought fit, box-boards delivered in shooks as if they were a different type of box.

In addition, the Dairy Board is given power to charge additional freights if it considers that additional freight should in equity be charged to dairy factory proprietors who desire their boxes to be delivered by rail, but who do not subsequently consign the boxes when packed with butter to grading stores by rail, thus incurring penal rail freights on boxes delivered to them.

A dairy factory proprietor may now be required by the Dairy Board to maintain such stocks of boxes as the Board considers necessary, and to provide suitable and adequate storage for them.

Box-makers are also required to maintain suitable plant and equipment to test the moisture content of timber used in the manufacture of butter boxes and to keep proper records of the results of such tests. The regulations reserve to the Board the power to carry out at any time tests to determine the moisture content of timber so used by a box-maker.

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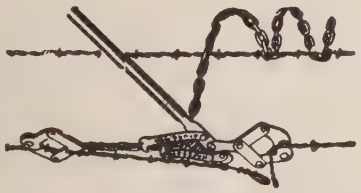

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Asparagus In Canterbury

Planting, Growing and Cultivation of Crops

B. G. GOODWIN, Orchard Instructor, Christchurch.

THE edible stems of the asparagus plant form one of the most acceptable and healthful of vegetables. *Asparagus officinalis*, as it is botanically known, is a native of temperate Europe and Asia, and in its native habitat the plant grows in the sands of the seashores. Asparagus is easy to grow on suitable land, and once the bed is established it gives perhaps less trouble than many other vegetables more commonly grown.

The principal localities in which asparagus is grown in the Canterbury district are Papanui, New Brighton, Kaiapoi, Burwood, and St. Martins. The individual commercial areas range from ¼ acre to 5 acres. Soil in which asparagus is grown varies from almost pure sand near the seashore to heavy silt and loam which is always moist but well drained. The main varieties grown are Connover's Colossal and Palmetto.

Methods of Planting

The methods of planting vary slightly. The soil is prepared by deep ploughing in the treatment of large areas, or by trenching when the area is small, and is cultivated afterwards by disk or spring-tooth harrows for some months to destroy the weeds. When the soil is considered to be clean and in suitable condition furrows are made, varying from 3ft to 5ft apart, and the plants are set from 2ft to 3ft apart.

The greater distance between rows appears to be preferable, as the crown, having more room in which to grow, increases the size of the spears. Also, in the larger areas this enables the cultivation to be carried out by horse or tractor implements. The crowns are set in the furrows at a depth of from 6in to 9in, and the roots spread carefully by hand. They are then covered to a depth of from 2in to 3in with fine soil. When the crown has made some growth new soil is drawn in, and this is repeated at intervals, so that before the end of the growing season the furrows are filled.

Ploughing and Digging

In the autumn, after the foliage has been cut and burnt, ploughing or digging is carried out, ridging up the plants to rot the stubble, and leaving a hollow between the rows. This ensures better drainage of the surface water, which is essential in growing satisfactory crops. In the spring the ridges are ploughed or dug back into the centre of the rows, and are kept lightly cultivated until the plants begin to make growth, care being taken not to damage any of the young and tender spears.

Farm-yard manure is applied liberally in the autumn after ploughing or digging, and appears to give the best results. As an alternative, fowl-manure is also applied in small quantities at the same period, and gives quite fair results, but it has a tendency to make some soils hard, and is inclined to form a crust. Blood and bone is sometimes applied at 2cwt per acre in the autumn, and from 7cwt to 8cwt per acre in the early spring with quite good results. Seaweed is applied liberally in the autumn in districts near the seashore, and is apparently giving good results. Dressings of nitrate of soda in early spring at the rate of 2cwt per acre, in addition to blood and bone, has also given good results. Sandy silt from riverbeds applied at 70 yards per ¼ acre has given excellent results.

Cutting the Crops

The best crops are obtained from beds that are not cut until the third season, thus allowing the plants first to make good crowns and to develop a strong rooting system. Cutting is begun from early September to October, varying according to locality, and usually finishes in late November, but occasionally it is extended to the middle of December. The quality and size of crops vary according to soil management and weather conditions.

If a cold season is experienced the crops are light, but if the season is mild a heavy yield is the result. From experience of the Canterbury district I would estimate a fair average crop to be from 2,500lb to 3,000lb per acre. The crops are tied up in bundles of approximately 1lb, and are carefully packed into boxes for immediate despatch.

The main difficulty in growing asparagus in Canterbury is the danger of late frosts in October and November. Hailstorms occasionally cause considerable damage to the crops by cutting the tender skins and causing the spears to bend over and snap off. A strong wind blowing dust against the spears will also have much the same effect. Warm, north-west winds will cause such rapid growth that it becomes impossible on large areas to keep up with the cutting before the heads of the spears have broken into growth.

Treating Haystack Covers

B.M. (WAIHI):—

On page 244 of the "Journal of Agriculture" for March there is a reply to a query re the immersion of haystack covers in a bluestone solution. I take it for granted that this is to preserve the cover, and, if so, I would be much obliged if you could let me have particulars as to how to make this solution.

FIELDS DIVISION:—

The object of immersing sack covers in a bluestone solution is to prevent the growth of moulds. Covers that have not been so treated will last for a few months only, whereas treated covers may last two or three years.

The solution is quite simply prepared. Take 2lb of bluestone and dissolve it in 20 gallons of fresh water. Bluestone is quite soluble in water. The sacks should then be well soaked in this material to ensure that they are thoroughly saturated. Sacks so treated are no more difficult to sew than untreated bags.

Pedigree Sow Records

Contributed by the LIVESTOCK DIVISION

OF THE 114 sows recorded during the quarter ended 31st May, 1939, eighty-two had litters sufficiently good enough to be included in one of the grades set out below:—

Grade.	Litter Weight.	
	At 3 weeks.	At 8 weeks.
1	120	360
2	100	300
3	90	270
4	80	240
5	70	210

In the following list the owner's name and address are given, followed by the herd book number of the sow and the grade of litter produced:—

Berkshires.

Awakino Pig Club (T. Williams), Awakino Point, Dargaville, 12809/4; Bulls Pig Club (R. H. Guy), Bulls, 13828/3; Drury Pig Club (J. A. Paterson), Opaheke, R.D., Papakura, 12942/1; Ellerm, O. C., Sanson, R. D., Palmerston North, 12708/4; Fairburns Pig Club (Bruce Foster), R. M., Kaitaia, 13407/5; Grantham Bros., Matarau Road, Whangarei, 13663/5; Horeke-Utakura Pig Club (David Maxwell), Kohukohu, 12791/5; Jackson, H. M., Ngaere, 11816/2, 13487/1, 13034/2, 12275/3; Kahungunu Pig Club (Rae Gilmore), Nuhaka, 12811/4; Kaimoe Pig Club (L. Munro), Box 47, Patutahi, Gisborne, 12551/4; Kaingaroa Pig Club (G. A. Morpheth), R. D., Kaitaia, 12810/3; Kainui Pig Club (Chas. P. Haigh), Kainui, Taupiri, 13833/5;McGill and Son, Ngahape R. D., Te Kawa, 13456/4, 11982/4; MacIndoe, C. G., Te Matai Road, Te Puke, 12372/5; Maharahara Pig Club (E. D. Pinkham), Maharahara, 13772/5; Ngararatunua Pig Club (J. B. Logan), Kamo, Whangarei, 12827/3; Ormond Pig Club (S. B. Davies), Ormond, Gisborne, 12806/1; O'Sullivan, A. M., Cardiff, Stratford, 14071/5, 12908/1; Otakiri Pig Club (L. Cristall), Otakiri, Bay of Plenty), 13664/5; Rangitira Pig Club (G. D. Withers), Waipaoa, via Gisborne, 12598/2; Rotomanu Pig Club (H. E. Hodgkinson), Rotomanu, Westland, 12798/3; Ruakaka Pig Club (J. C. Sandford), Ruakaka, 12814/5; Te Poi Pig Club (Geo. L. Bellamy), Te Poi R.D., Matamata, 14357/2; Unwin, S., Winchester, South Canterbury, 12840/2; Waimatatini School Pig Club, Ruatoria, 13875/2; Warkworth Pig Club (F. D. Miller), Warkworth, 12787/5.

Large Blacks

Barnett, I. A., Tahuna, Private Bag, Morrinsville, 1678/4; Boland, Mrs. R. A. A., Longford, Nelson, 1686/5, 1688/2; McGill and Son, Ngapahe R. D., Te Kawa, 1554/4; Ngongotaha Pig Club (K. M. Martin), Box 13, Ngongotaha, 1651/3; Pedersen, N. P., Kauwhata P.O., Palmerston North, 1109/3; Pio Pio Pig Club, Pio Pio, 1738/2; Rotorua Pig Club (B. Bray), P.O. Box 161, Rotorua, 1654/3; Te Anga Pig Club (D. A. Burt), R.D., Te Kuiti, 1740/4; Whitelock, G. M., Newbury R.D., Palmerston North, 1718/1, 1540/2.

Large Whites

Kumeu Pig Club (J. H. Outram), Huapai, Kaipara Line, 4942/2; Mauriceville Pig Club (N. Myers), Mauriceville, 4936/3; Mortinsen, H. E., Mauriceville West, 5068/2; Parsons, J. E., Pukeroro, Yuleba Vanessa/1; Rowlands, T. E., Ruthin R.M.D., Kaiapoi, 4437/5, 4984/2, 4985/2; Whitelock, G. M., Newbury R.D., Palmerston North, 2486/3.

Tamworths

Awanui Pig Club (M. H. Bird), Awanui, 9360/5; Babe, E., Waikiekie, 8178/5; Brown, G., Puha, 9160/3; Dalefield Pig Club (W. Press), Dalefield, Carterton, 10072/3; Deck, G., R.M.D., Upper Moutere, 10107/1; Glen Oroua Pig Club, R.D., Glen Oroua, 8479/4; Hickmott, E. J., North Road, Belfast, Christchurch, 10569/5; Hohonu Pig Club, Hohonu, via Kumara, Westland, 10121/5; Hunt, C. S., Glen Oroua, 9636/2; Kaihere Pig Club, Kaihere R.D., Ngatea, 10096/5; Kaikoura Pig Club (H. E. Mackle), Kaikoura, 10289/2; Kaipara Flats Pig Club (B. Andrews), Kaipara Flats, 9723/4; Karamea Pig Club (T. H. Jennings), R.M.D., Karamea, 10122/4; Kauri Pig Club (C. W. Bell), Kauri, Whangarei, 9438/5; Kumeu Pig Club (J. H. Outram), Huapai, Kaipara Line, 8670/3;; Linton Pig Club (E. H. Bowler), Linton, 9747/2; Muff Bros., Ohapi, Orari, 7466/3; Ngararatunua Pig Club (J. B. Logan), Kamo, Whangarei, 9724/1; Nuhaka Pig Club (D. A. Hughes), Wairoa, H.B., 9726/4; Philpott, M. E., Medbury, R. M., Hawarden, 6775/4; Rangiwahia Pig Club (E. J. B. Pemberton), Rangiwahia R.D., Kimbolton, 10447/5; Ruatoria Pig Club (H. W. Thatcher), Ruatoria, 9882/2; South Featherston Pig Club (R. Foss), Featherston, 9746/3; Suter, E., Waiau Pa, 9798/2, 10385/5; Te Arai Pig Club (F. Robb), Manutuke, Gisborne, 9574/2; Te Matai Pig Club (K. H. Ralfe), Te Puke, 10184/2; Turiwiri Pig Club (K. Simons), Turiwiri, Dargaville, 8334/4; Waerenga Pig Club (F. D. Holt), Waerenga, 8749/4; Waiotira-Waikiekie Pig Club (P. Leech), Waikiekie, 9919/4; Wairoa Pig Club (Mrs. Watson), 11 Mahia Avenue, Wairoa, H.B., 9697/5; Whakatahu Katae, Tikitiki, 10756/5.

THE following table sets out the performance of each breed and the average of all sows recorded during the quarter:—

Breed.	No. of Sows.	Averages.					
		Number of Pigs		Little Weight.		Weight per Piglet.	
		Born.	Weaned.	Three Weeks.	Eight Weeks.	Three Weeks.	Eight Weeks.
Berkshire ..	40	9.5	7.6	85.3	273.8	11.2	36.0
Large Black ..	16	9.8	6.8	86.6	270.2	12.7	39.7
Large White ..	10	10.3	8.1	95.3	296.1	11.7	36.5
Tamworth ..	48	8.8	7.0	81.1	272.0	11.5	38.8

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Veterinary Notes for the Farmer

Discussions on First-aid Measures

Contributed by the Live-stock Division

Eczema In Dogs

ECZEMA, or more correctly speaking, "dermatitis," is a non-contagious affection of the skin characterised by the eruption of minute vesicles in great numbers and frequently confluent upon a surface of irregular form and usually of considerable extent. It is one of the commonest forms of skin disease in this country. Two forms are generally recognised, (1) the acute, and (2) the chronic, with, of course, intermediate stages between these two. The latter may be subdivided into, (a) generalised, and (b) localised.

The "acute" form is found most commonly on the back, head, or the outside of the shoulders or hips. It appears suddenly. The animal is apparently normal at night, but exhibits the following morning an area varying from the size of a half-crown to the palm of the hand of highly inflamed, hairless skin covered with a clear, sticky discharge which congeals and mats the hairs at the bounding line of the lesion. The general appearance is that of a burn from boiling water, and it is usually diagnosed by the owner as being such. This form of eczema is very painful.

"Red Mange"

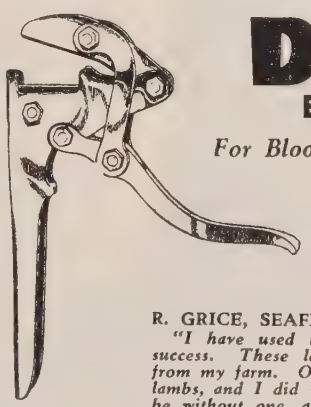
"Red mange," so-called, is another form of eczema, but not so acute as the former. This is more noticeable inside the elbows, on the abdomen, and inside the thighs, the skin appearing as if painted with red ink and denuded of most of the hair. Where the legs and feet are affected, they become swollen and painful.

There is also an "acute" form of eczema, seen only during the summer months, which is due to irritation from flea bites. Some dogs, like human beings, appear to suffer no inconvenience whatever from these parasites, while others are very susceptible.

As the intermediate stage of one of the tape worms affecting the dog is passed in the flea, the desirability of ridding the dog of these pests is very much increased. In "acute" eczema there is great irritation, the animal attempting to bite and scratch either the neighbourhood of or the affected part. The animal gets no rest, and there are symptoms of general constitutional disturbance.

One attack of eczema predisposes to another, and eventually the condition becomes "chronic" unless proper treatment is adopted. In the latter type the skin becomes thickened, wrinkled, and scaly; it is non-painful, but itchy and practically denuded of hair, giving the animal a most unsightly appearance. The "localised" form may attack such parts as the scrotum or between the toes.

"Eczema" has been attributed to one, or a combination of, the following agents:—Poor diet, too frequent baths, worms, nervousness, kidney disease, focal infection, skin parasites, and heredity. The two main causes are, however, injudicious feeding and insufficient exercise. Consequently, when the question of treatment arises these two factors should receive first attention. Generally speaking, a hungry dog is a healthy dog.



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"I have used the Daroux Emasculator on my lambs with great success. These lambs were the heaviest that have been delivered from my farm. Of a consignment of 332, most of them were wether lambs, and I did not lose one. My advice is that no farmer should be without one, and if they were £10, I would still buy a Daroux Emasculator, as they are worth their weight in gold."

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There is a very great divergence between appetite and hunger. One good meal a day is necessary for all dogs. Its composition should, however, be determined by the nature of the work the dog is engaged upon. Meat is the ideal food for a hard working dog, but the more his life becomes of a sedentary nature the less meat he should receive, the bulk of the meal being kept the same by the addition of well-boiled rice.

It has been found beneficial where eczema is present to give the animal a good purgative dose of medicine—if worm medicine all the better—and to follow this up with a complete change of diet. If on meat, then change to rice and milk, or vice versa. The affected parts should have applications made to suit the particular type of eczema, but rubbing and washing should be avoided.

There is no specific medicinal treatment, each case having to be treated on its merits. The main object to aim at is to restore the animal's system to a healthy condition by natural methods of correct feeding and exercise, without which no application will have any permanent effect.

Rearing an Orphan Foal

IN THE event of a mare dying from some cause or other the question how best to attempt to rear the orphan foal arises.

The best way, of course, is to rear it on a foster mother, but the difficulties in regard to this are obvious, and it is only in a few cases that it is possible. The hand-rearing of an orphan foal has always been a difficult problem, both from the point of view of getting satisfactory results and because of the labour and trouble involved.

For the food, cow's milk has to be substituted, and to appreciate the procedure it is advisable to have some idea of the analysis of cow's milk as compared with that of the mare:—

	Mare Per cent.	Cow Per cent.
Total Solids	10.96	12.6
Protein	2.69	3.5
Fat	1.59	3.5
Sugar	6.14	4.8
Ash	0.57	0.8

The essential differences are that the protein and fat content are higher and the sugar content lower in cow's milk than in mare's.

Choosing the Milk

The milk to be used should be chosen from a tuberculin-tested cow, and from one whose milk has a low fat-content. If possible, select a new milch cow, that is, one very recently calved. Having settled the cow question, the next matter is the preparation of the food.

Dissolve a tablespoonful of sugar in a little warm water; lactose, which is the sugar of milk, is the best kind of sugar to use, but it is rather expensive. Failing this, glucose is the next most suitable sugar. To the dissolved sugar add three tablespoonfuls of lime water and then enough fresh milk to make one pint.

This prepared food should be warmed to blood heat before being administered, and for the first few days the foal is given five fluid ounces (that is,

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The DRENCH is a wonderful help at calving time. In the case of an unthrifty cow, the response is immediate: while the remedy is invaluable for chill, hard quarter, ropey milk, scouring, or kindred ailment.

PRICE: (In airtight tins) containing about 30 drenches per tin, £1-7-6; 15 drenches, 14/6; 7 drenches, 8/-. In packets, per dozen, 17/6. (These prices do not include freight.)

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one quarter of a pint) every hour. The food is best given from a bottle with a large nipple. As the foal grows the quantity of food and the intervals between feeding are increased. After a week, six feeds per day will be enough, and later only four.

Regular Feeding

In six weeks skimmed milk can be gradually substituted for whole milk, and after three months the foal may be given all it can drink three times a day. By this time, of course, it should have been taught to drink from a bucket. Feeding should be carried out with proper regularity, and the temperature of the milk must always be at blood heat. All utensils used in feeding must be kept scrupulously clean, all vessels being rinsed out with clean cold water after use and then properly washed and scalded.

At about three weeks of age the foal will begin to nibble grass. A clean pasture which has been well limed comparatively recently is best, as lime is essential for building up bone.

When two months old the foal will take a little dry feed. Oatmeal and brand are easily digested foods, and may be given in small quantities.

When the milk diet is finally relinquished it is a very good plan to give a small quantity of cod liver oil in the food.

Ringworm in Cattle

RINGWORM in cattle usually occurs in the winter, and is frequently seen in young stock which have been weaned and turned out for the winter.

The writer saw a whole dairy herd of about 20 cows last year in the Marlborough district which were badly affected.

Lesions consist of patches of skin denuded of hair, roughly circular, and sharply defined in outline. In the early stages raised circles of hair may be seen, which, when pulled off, are found to consist of scabby material and loose hair, and leave a raw bare or scurfy patch. In young stock the patches are mostly about the head, and develop a hard scale after a little time.

Treatment consists in removing completely all the scabby material with soap and warm water and, when dry, applying tincture of iodine. This should be repeated for a few days, and if the lesions to be treated are numerous or iodine is not available methylated spirits or kerosene will be found useful.

The disease is communicable to man, and care should therefore be taken in handling these animals to avoid infection.

Answers to Correspondents

"Pink Eye" in Lambs.

F.L.S. (STUDHOLME JUNCTION):—

I have a small line of cull lambs, some of which are running at the eyes. At a later stage a film comes over the pupil, causing blindness.

I have been told that this is "pink eye." I am treating the lambs by putting drops in their eyes and separating them from the rest of the mob.

I should be glad of any information you can give me as to correct treatment.

LIVESTOCK DIVISION:—

You are probably correct in surmising that it is "pink eye" which is affecting the lambs. This disease, which is contagious, has been very prevalent this season in all classes of sheep.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Every endeavour should be made to eliminate the condition from your flock before lambing comes on, as serious trouble will probably arise among the ewes and young lambs. In the first place, separate all affected and suspected animals from the healthy ones and keep them segregated until completely cured.

The main essential in treatment is to begin this immediately the first symptom is noticed, i.e., increased flow of tears and a slight reddening

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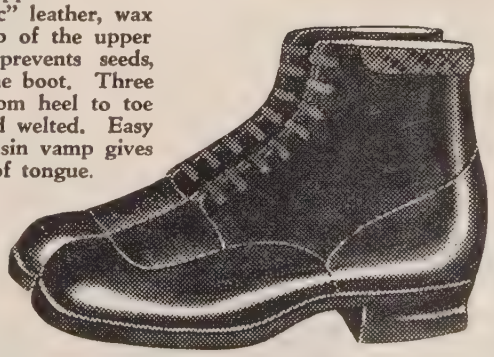

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of the rims of the eyelids. The longer they are left before treatment is applied, the longer it takes to effect a cure.

The following lotion is recommended:—Zinc sulphate, 5 grains; water, 1oz.

Place a few drops in the eye daily. This is best done by means of a small oil can which has been well sterilised by boiling.

Colic in Horses.

G.W.L. (OTANE):—

I have an occasional case of colic among my draft horses after a feed of chaff.

Would you kindly advise me as to a corrective measure, and treatment.

LIVESTOCK DIVISION:—

This is not at all uncommon, particularly where horses which have been turned out and running on grass alone are brought in, given a chaff feed, and then worked afterwards. The alimentary tract is not prepared, as it were, to deal with a comparatively unaccustomed feed, and the work further reduces the activity of the intestine and the amount of fluid discharged into the bowel from the glands lining it. A condition of dryness and impaction, or stoppage, in the last part of the small intestine may thus occur, with colicky pains, which, in some cases, are fairly severe and last for some hours.

Such cases are common in the annual military camps, with green horses coming on to hard feed and work, unless precautions are taken.

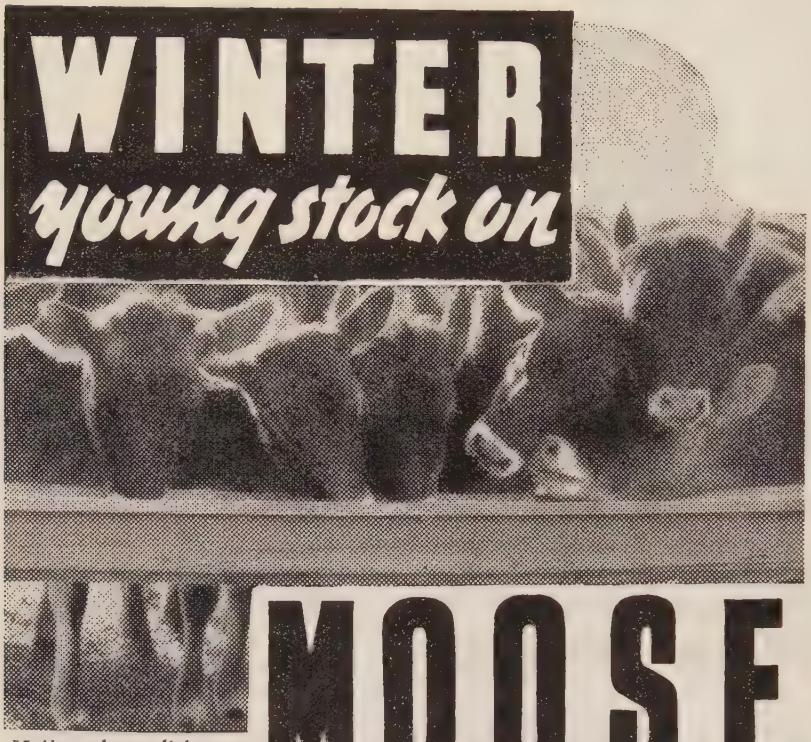
Preventive measures would be:—(1) Starting the hard feed in small amounts two or three days before the horses are expected to work; (2) making sure the horses get ample water to drink (watering after feeding, though discouraged by many authorities, is less risky than failing to allow the animal sufficient water), and (3) adding a certain amount of bran to the first feeds. Salt should be available.

Where cases are frequent in horses on regular hard feed and constant work, the quality of the feed should be looked into, and the watering arrangements likewise.

For treatment, see this journal, January, 1939, p. 61. The drench there advised—1oz chloral hydrate dissolved in a pint of water and given with one pint of raw linseed oil—should be given.

On a Canterbury property a field was sown down last autumn with Huskless oats. Compared with a field of Algerians grown on the same place and under similar conditions, the Huskless had not withstood the severe winter conditions experienced last year in Canterbury as well as the Algerians. The growth was not so vigorous, nor did it have the same healthy colour. Even in the field itself a comparison could be made, the headland being far superior to the rest of the field, due no doubt to shelter from the gorse hedges.

WINTER young stock on



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Heifer calves relish their Moose.

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Farm Practice and Management

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Appointment And Transfer Of Fields Superintendents

CONSEQUENT upon the appointment of Mr. P. W. Smallfield as Officer-in-Charge, Animal Research Station, Ruakura, Mr. J. M. Smith, Fields Superintendent, Otago and Southland Provinces, has been transferred as Fields Superintendent of the Auckland Province, with headquarters

Mr. J. M. Smith

at Hamilton. His place in Otago and Southland has been taken by Mr. J. W. Woodcock, formerly Crop Experimentalist, Wellington.

Mr. Smith was born in New Zealand, and was educated at Otaki Primary School and Levin District High School, winning a senior rural scholarship at the latter. After a year as cadet at the Weraroa Experimental Farm he was in residence at Hawkesbury Agricultural College, New South Wales, for three years and graduated from there in 1917, winning the Burdekin silver medal. He joined the Department of Agriculture in 1918 as Cadet Instructor at the Moumahaki Experimental Farm.

In 1920, he was appointed Assistant Instructor in Agriculture at Wellington, and he was later transferred to Marton and Wanganui as Instructor in Agriculture. He was appointed Instructor in Charge of North Taranaki in 1925, and in 1934 he was appointed Fields Superintendent for Otago-Southland.

Mr. Smith was instrumental in resuscitating field competitions in the south, and is chairman of the competitions committee. He is a foundation member of the Agricultural Section of the Royal Society in Otago and a past president, and at present is honorary secretary. He is an honorary member of the Otago Provincial Council of the Farmers' Union, and vice-chairman of the Young Farmers' Clubs. He is also a member of the Hydatid Advisory Committee. He was a member of the Erosion Committee set up by the Government last year, and a member of the Irrigation Committee.

Mr. Woodcock was born in Yorkshire, England. After leaving high school in 1917 he joined the British Army and served for two years. After demobilisation he obtained practical experience on farms in Yorkshire, and during 1920-23 he studied at the University of Leeds, where he obtained the National Diploma in Agriculture.

Late in 1923 he sailed for New Zealand, and in order to get acquainted with colonial conditions worked on farms in the South Island for the next two years.

Mr. Woodcock joined the Department of Agriculture in 1925 as Assistant-Instructor in Agriculture, Auckland. In 1927, he was transferred to Taumarunui, and later was stationed in Hamilton as Instructor in Agriculture. In 1930 he was appointed Assistant Crop

Mr. J. W. Woodcock

Experimentalist at Palmerston North, and in 1935 promoted to Crop Experimentalist, Wellington.

In this last position, he has supervised the experimental work of the Fields Division throughout the Dominion, and has kept in close contact with research workers in other Departments. He has been a member of technical committees of the Plant Research Bureau, Wheat Research Institute, and Standards Institute.

Effect Of The Gorse Seed Weevil

A SUPPLY of the gorse seed weevil, *apion ulicis*, was obtained from the Cawthron Institute and liberated on some two or three gorse bushes on February 7, 1931, on the banks of the Manuherikia River, Central Otago.

At the request of the Cawthron Institute, during the latter part of January, 1939, more than 1000 gorse pods were taken at random over an area of approximately half a mile from where the weevils were liberated, and sent to the Institute for examination. The result of this examination showed that the infestation amounted to 98.67 per cent.

From the figure quoted there is no doubt that the gorse seed weevil is a valuable insect for controlling or nullifying the production of seed from gorse. This opens up pleasant prospects of establishing the insect on the many thousands of miles of gorse hedges in New Zealand, thus controlling the production of seed and the invasion of gorse from hedges on to the land.

Unfortunately the weevil does not restrict the growth or vitality of established plants, but lives on the seeds in the pod, consequently infested plants will continue to flourish, and after grubbing or burning growth will shoot from the dormant gorse seed lying in the ground, and produced by the parent plant before the advent of the weevil. Even with the weevil well established this generation cannot expect to see much improvement from the work of the insect, although later generations will undoubtedly reap the benefit.

It appears as if this insect requires dry or sunny conditions, as it is doing well in Nelson and in Central Otago, but has been difficult to establish on the coastal area of Otago.

Slate grey in colour and approximately 1-8in in length, the insects can readily be observed on the flowering parts of the plants. Eggs are deposited in the immature pods, and as the pod and seeds grow so do the young weevils until the pod has ripened into a dark colour, and upon opening one has a pod of weevils and no seed.

—G. G. CALDER, Instructor in Agriculture, Alexandra.

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Pampas Grass As A Winter Feed On Hill Country

THERE is no doubt that if a suitable area of pampas grass were established on many steep hill-country properties the problem of management would be considerably easier.

On many hill country farms it is necessary to carry a considerable number of cattle to control effectively the pastures and secondary growth during the spring and summer months. When winter approaches these cattle must be disposed of, and unless the farmer has been able to fatten the cattle they are probably sold at a loss. A number of farmers are becoming interested in pampas grass as a means of carrying their cattle over the winter, and fresh areas of this grass are being planted out each year.

Unfortunately, pampas grass is not as easy to establish as it would appear. Well-rooted yearling plants are preferable to cuttings, and unless care is taken the death rate in transplantings is high. It is therefore advisable to cultivate the land whenever possible before planting. Unfortunately, on much of the land under review ploughable land is very scarce, and in many cases is situated on remote portions of the farm, making transport of implements, etc., difficult.

Obstacles Overcome

On one farm in the Wairoa District the owner has overcome this obstacle by packing. The plough was packed and the discs dissembled and taken in pieces, and the pampas plants were also carted in the same manner. Every precaution was taken to ensure that the plants, which necessarily had to travel a long distance and be out of the ground a long time before planting, should receive every assistance to establish.

Fig. 1.—The plough and discs packed for carting.

When taken from the bundles plants were dipped in a solution of liquid manure and laid in a shallow trench awaiting their turn to be planted out. When ready, as many plants as would fit were placed in a benzine tin and the roots covered with liquid manure. The tin was carried by the planter, and as each plant was removed and placed in the ground its roots were therefore moist and at no time exposed to drying conditions. In this manner approximately three acres were planted out. It will not be necessary to pack on all farms, but it is most necessary that all care should be taken that the necessary preparations for planting should be thorough. The average number of plants which live under ordinary farm establishment practices is probably not more than 70 per cent., and this percentage is much reduced when plants are many days in transport.

—R. P. HILL, Fields Instructor, Hastings.

Fig. 2.—Left: The plants being dipped in a solution of liquid manure.
Right: The planting in progress.

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Try this guaranteed manure distributor at our expense. Twenty acres a day—any country. Saves time, labour, and money. Price, 25/-. Illustrated pamphlet and money-back guarantee on request.
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Planting Flax Shelter Belts

MANY of the most highly productive dairy farms are situated on areas of rich alluvial soil which, before completely draining, were eminently suited to the growing of New Zealand flax (*Phormium tenax*). In some districts flax has been planted in shelter rows and clumps, and, when cut every four or five years, not only provides shelter for stock, but also augments the farm income. Little doubt exists that similar use could be made of flax on dairy farms in other localities.

Fig. 1.—A suitable type of flax bush from which to obtain fans for planting.

Selection of Plants

For shelter planting, good high-yielding plants with leaves containing a high percentage of strong fibre are necessary. In addition, as shelter is the primary object of planting, fans from large, strong-leaved, tall-growing, dense plants should be obtained. After selecting the flax bushes from which to procure the fans the leaves may be cut off, and then it is possible to dig away the surrounding soil, beginning some little distance from the roots.

The small spindly fans, as well as those from which grew a flowering stalk the previous season, should be discarded. The former produce weak plants, while many of the latter fail to strike. The selected fans may be easily separated by cutting out with a spade, care being taken to leave as

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and COSTS *DOWN*!

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many roots as possible attached. If the plants cannot be planted the same day they should be covered with loose grass or old leaves to prevent frost damage.

Planting.

Planting may be carried out from May onwards, but in districts liable to heavy frosts it is wise to delay operations until the spring. For continuous belts the plants may be spaced in single or double rows, plants being spaced 5ft. apart. In many cases clumps of flax planted at the corners of paddocks prove as effective as continuous belts.

The fans are planted with at least one-third in the ground and inclined away from the rainy quarter. The soil is well firmed around the roots.

Protection.

No further attention is required, but the plants must be protected from dairy cows, which chew the leaves and are apt to pull up the newly-planted fans. To avoid this damage fencing is necessary, as is the case with practically all other shelter plants. A suitable fence consists of three barbs, well stapled and battened, and placed at least 3ft. 6in. from the line of plants.

—E. H. ARNOLD, Instructor in Agriculture, Dargaville.

Fig. 2.—A view of the flax bush shown in Fig. 1., when cutting away the leaves.

Fig. 3.—Flax fans three weeks after planting.

Conveyance Of Sheep

THE NECESSITY of having a proper consignment note for the conveyance of sheep as required by the Stock Amendment Act, 1938, was emphasised by a recent prosecution against a firm of carriers for failing to obtain such a note.

Evidence for the prosecution was that the defendant firm had been transporting sheep without being the holder of a signed consignment note from the owner or his authorised agent. For the defendant firm it was pleaded that it not infrequently happened that the carrier or driver was unable to obtain the signature of the owner of the sheep, or his authorised agent, to the consignment note.

In convicting the defendant firm the magistrate said that he was unable to accept a plea of impossibility in respect of securing the signature of the owner to the consignment note, as such a position should never arise. The Act stated plainly that the owner or his authorised agent should sign the consignment note, and until this signature was obtained the carrier should not remove the sheep.

This case is cited for the purpose of impressing upon farmers generally, for whose protection the statute was passed, the necessity for complete co-operation with carriers in respect of the use of consignment notes for the conveyance of sheep duly signed by both parties or their authorised agent to insure the smooth working of the procedure laid down by the Act.

Wintering Heifers On Sheep Farms

SHEEP farmers realise the value of cattle for controlling and cleaning up long mature feed and generally assisting in the control of grass. Most sheep owners have used beef cattle to do this work, and have carried a breeding herd and their offspring throughout the season.

These cattle were formerly regarded purely as machines for controlling pasture, but in later years, since the inauguration of the chilled beef trade, greater attention has been given to the breeding and quality of stock used for this purpose. The consequent demand for the relatively small supply of high-class breeding stock available has resulted in very high prices.

A good line of two-year-old dairy heifers.

Many high producing dairy farms are fully stocked with milking cows, and it is impossible and perhaps unprofitable to carry young, unproductive stock for replacements. Some sheep farmers have taken advantage of this flaw in the dairying system, and yearling calves from dairy farms are bought at reasonable prices and carried until they are two years old.

These stock can be purchased at much lower prices than either store or breeding beef stock, and if the sheep farmer has an improved farm within reasonable distance of dairying country where good yearling heifers are available advantage can be taken of this flaw in the dairying system to procure young dairy stock to control his pasture.

The usual practice is to purchase young dairying heifers in October, to carry them over until they are two years old, and then to sell them as springing two-year-old heifers in the spring, when stock of this class is in keen demand. As feed is usually very scarce at this period, this practice of selling the heifers in the early spring greatly alleviates the feed position.

The average price realised for yearling heifers is £4 per head, but when two years old and due to calve in the spring they will realise at least £10. This is surely a reasonable margin of profit, and it is obtained with a much smaller outlay than is necessary where high-priced breeding stock, with the consequent greater risk, are carried.

—W. T. BROWN, Instructor in Agriculture, Hamilton.

HAS YOUR PRODUCTION *INCREASED* THIS YEAR?

Writing on 26/4/39, Mr. W. CARTMILL, of Cambridge, says—
"Since January we have taken from 150 lb. up to 200 lb. of milk per day more than last year, and you know what a dry spell we've had—not a drop of rain since 29th January until the other day."

Another user in the Wanganui district sent his factory returns from 1st January to 10th April.
1938 - 7,022 lb. of fat. 1939 - 7,689 lb. of fat.

The experiences of these men are an indication of what the BEVIN HARROW has done for *hundreds* of others and *will* do for *you,* if you want to progress.

Incidentally, you'll have to do your experimenting for yourself, because, although we have asked responsible Officers of the Department of Agriculture to conduct experiments both with harrowing during the dry weather —and with harrowing in conjunction with varying quantities of fertilizer, to ascertain how little manure farmers actually need—we can get no satisfaction. We have been informed verbally that they are *too busy.*

From the experience of many hundreds of users, we know that the BEVIN HARROW will get results that will more than please you—hence our written guarantee makes provision for returning the Harrow up to 12 months after use, if you have not received results which are both satisfying to you, and well worth while.

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Horticultural Instruction

Contributed by Officers of the Horticulture Division

Orchard Notes

Pruning Apple and Pear Trees

THE PRUNING required by apple and pear trees varies considerably with the age and condition of individual trees and also according to variety. Bearing trees require a careful and complete pruning each winter to maintain a condition in the tree conducive to regular cropping.

Up to a certain period in the natural development and life of a fruit tree growth is abundant and fruiting is relatively poor, during which time the tree is expanding in size, and pruning is designed to regulate and direct growth in building a framework capable of carrying the weight of subsequent heavy crops. In the building process expansion must be rapid or slow in relative proportion to the vigour displayed.

A tree making abundant and strong shoots may be allowed to extend quickly by utilising the greater portion of the length of the new shoots selected for an extension upward of the framework each year, while the medium lateral growths suitably placed should be trained into a horizontal position for the permanent fruiting arms, and such extension in width may also be fairly rapid. The whole length of vertical shoots should not be retained in extending the height of the framework, otherwise there is a danger of attaining too much height for the anchorage secured and before the lower framework has thickened out sufficiently to carry the greatly increased height safely.

Spacing Laterals

Laterals selected for development of fruiting arms should be sufficiently spaced to allow the access of abundant light right to the base, otherwise fruiting will tend to be carried more towards the outer portions. Lateral extension should not be too rapid, but should be controlled by the removal of a portion of the length of annual growth at each winter pruning. Skilful manipulation, by taking advantage of the position of certain buds and cutting back to those suitably placed, enables the pruner to encourage a more horizontal tendency in laterals so treated. Strong laterals intending to sweep upwards and compete with the selected leading shoots should be cut away.

Trees making slender growth must not be allowed to extend in height too rapidly, otherwise strength of limb would not be attained, early cropping may result, followed by a stunting of growth. Extension must be gradual, and a much shorter portion of annual shoots retained for a permanent extension of the framework.

As growth gradually slackens in apple trees, fruitfulness increases, and it is at this latter stage that much judgment is required in pruning to prevent over-cropping and stagnation in growth. Non-pruning or very light pruning would induce very heavy fruit bud development on all the previous season's laterals and, if left intact, fruiting would be excessively heavy, with much undersize fruit in the following season. A certain amount of the older fruiting wood must be removed from all over the tree to force new shoots.

Light year-old laterals must also be thinned out and shortened to regulate the production of additional fruit spurs and thus reduce the tendency towards over-cropping. The strongest foliage develops on healthy new shoots arising from cuts, so that where the cutting back is sufficiently heavy to force new shoots throughout the tree sufficient energy is provided to develop fruit buds for the following season's crop.

General Pruning

The general pruning on bearing apple trees should be to shorten extended and weakened laterals by cutting to strong buds or another strong shoot arising therefrom. New shoots should be thinned out, and those retained should be cut back to half their length. Very dense trees may also be thinned out by the complete removal of crowded main limbs.

The quantity of wood removed should be taken evenly from all over the tree and not just from one portion. In extreme cases where growth has stagnated, severe treatment may be required to stimulate growth sufficiently, even to the extent of skeletonising the framework and allowing it to refurnish itself. Some apple varieties are inclined to become over-spurred, in which case a detailed thinning out of fruit spurs is the type of pruning required. Multiple spurs may be reduced to a single healthy spur with advantage. New growth will invariably result from such treatment if the tree is in sound condition otherwise.

Some apple varieties are pronounced tip-bearers and make spurs rather sparsely, as with Rome Beauty. In such cases the increase in fruiting is by the natural division of laterals from

terminal buds, which also carry fruits. It is only when fruit is inclined to become small that a thinning out of the rather tangled laterals becomes necessary.

Abundant Light

The main consideration in pruning the older pear trees is to check the natural tendency towards over-crowding, which results in a lack of fruitfulness except towards the top of the trees or on outside rows.

Many Winter Nelis trees planted in solid blocks have failed to carry reasonable crops until very severely thinned, almost to the point of skeletonising. Pear trees require abundant light, and must be maintained in a very open state. Abundant new growth is made each year, and, if left, would soon crowd the trees with weakly spur wood, which would blossom freely but would fail to set.

The general practice in full-grown pears is to remove all the new vertical growths arising from horizontal arms and introduce a few new lateral shoots to replace the older and worn-out spur system. Main limbs should be well spaced, and so, also, should be the horizontal arms. Where overcrowding occurs, whole limbs should be sawn out.

In the stronger-growing pear orchards trees soon become too tall for economical handling. Height needs reducing to a reasonable dimension. Tops, particularly, should be kept well thinned to allow a free penetration of light to every tree part. In a pear block trees should stand out individually and not be allowed to extend in breadth until they interlace.

Replacements

During the month trees may be delivered from the nursery for new planting. Unless the land is in a fairly dry state it is better to delay planting until nearer the spring. In the meantime, trees should be heeled-in in a suitable place and be thus kept in good condition until planting can proceed.

In actual planting it is necessary to trim off all broken and damaged roots, but the pruning back of the top is better done after planting, otherwise in handling during planting operations buds may become damaged, necessitating a further heading back.

—N. J. ADAMSON, District Supervisor, Nelson.

Citrus Notes

Care in Handling the Lemon Crop

THE CARE with which citrus fruits should be handled is emphasised by every writer dealing with the matter, and it still requires to be emphasised. The most critical period for all citrus fruits is from the time of picking until several weeks have elapsed. All fruits must be handled with maximum care if the heavy losses sustained annually are to be reduced to a minimum. It is desirable that the fruit should be handled by the owner himself during this critical period. If this is not possible, then adequate supervision is essential.

Harvesting Lemons

In harvesting the lemon crop a suitable conveyance for the orchard cases from the picking point to the grower's shed is the first prerequisite. For smaller orchards a handy cart with rubber tyres is suitable. This will carry four filled orchard cases each trip. For larger orchards a low-sprung waggon which can be drawn by horses or tractor is desirable.

Cases

The picking or orchard cases should be approximate in size to the standard bushel, that is, 10½in. x 11½in. x 18in. inside measurements, with suitable grips at each end and the bottom closely boarded to prevent the entry of soil or clippings.

It is found that cases with a capacity of over a bushel are too heavy for careful handling. As all cases are handled by man power it is unwise to use cases which, when filled with lemons, are of such a weight as to induce carelessness. The case should always be kept free from grit and prunings, as these soon cause abrasions on freshly picked fruit. It is also advisable to inspect the orchard cases just before the monthly pickings, and to remove all protruding nails, splinters, or other materials likely to cause injury.

An occasional sterilisation by scrubbing in boiling water or in a weak solution of formalin 40 per cent., 1 part in 120 parts of water, is also recommended. Further essential equipment consists of a light, adjustable ladder, a pair of sharp-edged but blunt clippers, and a picking bag or bucket.

Dates for Picking

Regular picking of the lemon crop is one of the vital factors which make for success, and every grower should plan his picking so that every tree is visited once every four weeks. Many growers prefer to begin picking at the beginning of each month and to continue until the orchard is finished. Others prefer to divide the orchard into blocks and to begin each block on a fixed date.

Where a large number of growers are supplying central curing depots it is better to divide the picking dates among them in order that too much fruit does not arrive at the depot simultaneously. A continuous supply to the depot can be readily planned.

When To Pick

It need not be mentioned that picking is a fine-weather operation. As the bulk of the lemon crop has to be harvested between July and October, it is not always possible to pick the fruit dry. However, during the periods of rapid growth in spring and autumn, fruit should be picked dry, or the oil spot often seen at this period will be in evidence.

Picking Operations

Before picking begins the orchard cases should be placed throughout the orchard in positions convenient for

the operators. The picking of lemons should be done by size, irrespective of colour or quality. The aim is to get the lemons which, when cured and packed, will result in the 216 count, as this is the preferred size for the markets of the Dominion. This means a green lemon of 2 3-8in. in diameter or a yellow of 2¼in.

Metal rings of these sizes are convenient checks on the pickers, but the experienced picker will soon judge by eye the fruit suitable for picking. An important point to remember is that on young, vigorously growing trees the very dark-green, immature lemons seen in the spring and autumn should never be picked for curing purposes. Such fruits are generally poor in juice content, and have an exceptionally thick rind. These fruits should either be discarded or, if in sufficient numbers, allowed to grow oversize and colour for peel purposes. All yellow lemons should be picked irrespective of size. Lemon picking is a relatively slow operation, but it must be done thoroughly.

Picking gloves should be worn, and the finger nails should be trimmed neat and short at the time of picking. Hold the lemon in the left hand and cut the fruit off with the secateurs as close to a lateral as possible without severing any other fruits. A second cut should then be made close up to the button. This second cut should be clean, or the protruding spur, which is often sharp, is liable to cause injury to other fruits.

The fruit is then placed in the picking bag which, when reasonably full, is carefully transferred into the orchard boxes. A variety of picking bags is available, but the best is possibly the picking bucket, as the firm nature of this bag keeps it open and minimises the risk of the fruit bruising against a ladder or tree branch.

Preliminary Sorting

Although all fruit up to size should be picked, it does not follow that all fruit picked should leave the orchard. At every picking there is a certain percentage of freak or ill-formed fruit, badly-scarred fruit due to wind damage, tree-ripened fruit with hollow core, and fruit damaged from other causes.

Much unnecessary expense to the grower could be avoided if a preliminary sorting were made at the orchard. This sorting would eliminate not only inferior fruit, but also a colour grading operation, as the bulk of the fruit at any one picking is generally of one colour. A few older orchard cases should be kept on hand, into which orchard reject lemons can be put. On no account should the rejects be left scattered throughout the orchard, for good orchard sanitation is the foundation of good control of disease. The rejects should be removed from the orchard and either buried or burnt.

Cases should not be filled to the top, as damage is likely to be caused by the case above when stacked. The lemons are then conveyed to the grower's shed, and from there either cured or delivered to a central depot. Great care should be taken in placing the cases on to the conveyance and in carting to the depot, as the fruit is still very susceptible to injury. If possible, a grower should deliver his own fruit or secure the services of a reliable carrier who realises his responsibilities.

—L. PAYNTER, District Supervisor, Auckland.

Viticulture

Phylloxera — Resistant Stocks

(Continued from May issue)

THE STOCK Berlandieri x Riparia 34 E.M. (Ecole de Montpellier) is another good stock which so far has given good results in New Zealand, though its use has been limited because of its recent introduction. Quoting Racah:

"The 420.A., the 157-11, and the Berlandieri Teleki are all good, but the 34 E.M. is perhaps better. Varieties subject to poor setting (coulure) grafted on this stock are rendered less liable to that defect. Delicate varieties are rendered more robust and their fruit more attractive. Precocious and early varieties are advanced a few days in ripening."

In France, according to Viala and Pechoutre, when compared with the 420.A grown on chalky soils it has shown a greater resistance to calcareous conditions, but this was not confirmed in every case. It was found to be a little less vigorous than the 420.A, and required a somewhat richer and moister soil. Its cuttings did not root as well, and the mother vines produced less wood. It had, however, the general qualities of 420.A., but this latter has taken, and is likely to take, a greater cultural importance.

The principal characteristics are:— Vigorous growth of spreading habit; trunk, short and thick; canes, round, with well marked ribs, dense and soft hair towards the tips; leaves, nearly round, large, entire, lobes indicated by longer teeth, the terminal tooth longer than the others and folded underneath, dark glossy green on the upper surface and lighter and duller underneath; nerves, strong, and furnished with brush-like hairs; two series of short, blunt teeth; texture of leaf, thick and coarse; petiolar sinus, deep and open. Petiole or stalk at right-angles to leaf.

The Berlandieri x Riparia 157-11 stock is preferable to 420.A. in deep rich soils too moist for that stock. It is more Riparia than Berlandieri, but combines the qualities of both parents. Its resistance to phylloxera is very good. Its resistance to chlorosis on calcareous soils is less than that of 420.A. and 34.E., but it can be used to advantage as a stock in moist soils containing not more than 30 per cent. of carbonate of lime. Under dry conditions it does not do so well as the two stocks mentioned.

The principal characteristics are:—Roots, strong and fleshy; vine, of medium vigour and spreading habit; trunk, thick, bark rather loose, in thin reddish-grey strips; canes, long, rather thin, cylindrical with well developed nodes, slightly downy; herbaceous shoots, light green tinted, rose towards the tips, dark brown when matured; leaves, large, longer than wide, heart shaped, with the terminal lobe very long and pointed; two series of teeth, distinctly marked, narrow and sharp; surface of leaf undulated or bullate, recalling the Riparia Gloire; glossy dark green, with the under side a lighter green, hairless on both faces; nerves, well marked, with small bunches of short hair at the angles of the principal nerves; petiolar sinus, very open V shaped; petiole, long, wine coloured.—

(To be continued.)

—J. C. WOODFIN, Vine and Wine Instructor, Te Kauwhata.

Cool Storage Notes

Constant Watch on Fruit

DURING the remainder of the season a constant watch is necessary with all fruit in cool storage to avoid losses from deterioration.

The seasonal conditions during the time the fruit has been maturing on the trees have been ideal for the production of fruit with the necessary qualities for holding successfully in cool storage.

There is still, however, good reason to keep a constant watch on the various varieties in cool storage. Fruit derived from trees with a light crop or from strong-growing grafts should be carefully kept under observation, as bitter pit is likely to develop on fruit that has been grown under these conditions. The dry seasonal conditions have been responsible for much of the fruit not coming up to size, and this has in many cases been responsible for the fruit being left on the tree longer than usual.

It may be necessary to keep Jonathan apples under observation in cool storage because of the tendency of this late-picked fruit to develop autumn spotting, which affects the appearance of the fruit and renders it unfit to display for sale. Soft scald is present in cool-stored Jonathan, and is found to have developed more in the fruit that was picked about the middle of March. The percentage of loss so far is very small, especially in the early and late pickings.

Wilt is another cause of loss in cool storage, and should be kept in mind when holding long-storage fruit, as some varieties have a tendency to deteriorate in this way. The Winter Cole pear is a variety which very often shows wilt quite early in its cool-storage life.

The following is a comparison of the rainfall in Hastings and Motueka for the seasons 1938 and 1939 for the months the fruit was developing. These figures are always of value, as rainfall at critical periods during the months the fruit is maturing plays a most important part in the formation of the flesh of the fruit, and therefore materially affects the performance of fruits during the time they are being held in the cool store.

Hastings.

	1938. Inches.	1939. Inches.
December	1.51	4.66
January	11.12	0.85
February	7.62	0.65
March	0.89	0.65

Motueka.

	1938. Inches.	1939. Inches.
December	2.88	5.22
January	4.08	0.11
February	7.63	0.15
March	1.61	0.15

—A. POWELL, Cool Storage Officer, Wellington.

Tobacco Notes

Liming the Land.

THE CULTIVATION of all tobacco land should be completed by the beginning of this month to allow the action of frost during June and July to have the beneficial effect of sweetening and pulverising the soil. The presence of seagulls following the plough shows that many caterpillars and cut-worms are being dislodged by the plough and collected by these birds. This will be of great advantage to the farmer next year.

Liming should be undertaken during this month at the rate of at least half a ton to the acre. The tobacco plant absorbs lime as a plant food in considerable quantities, and the lime action has a noticeable effect on the health of the plant, particularly on lands which have a clay subsoil. Tobacco grown on this type of soil without liming is very susceptible to angular spot. To be effective, lime should be applied at least three months before the planting of the crop.

The grading of tobacco is proceeding in all growers' sheds, and daily deliveries are being made to the depots of the various manufacturers.

—CHARLES LOWE, Tobacco Instructor, Motueka.

Vegetables, Small Fruits and Flowers

Contributed by the Horticulture Division

Keeping Land In Good Heart

THE CHIEF business of the farmer and homestead gardener is to keep his land clean and in a fertile state suitable for the crops grown, and to do so economically. Neglect or wrong treatment may cause damage that is repaired only after many seasons.

Where land is fair to heavy, much damage is often done by working it when wet. When planting or sowing is to be done it is hard to pass a suitable period on account of the land being wet, but it is better to plant late than to clod the land or get it into a state that forms a surface crust over seed beds.

Where dry conditions are comparatively rare during winter and spring they should be closely watched and full advantage taken of them as they occur, as it is specially important to make an early start with ploughing and trenching. Where land of this type is under intensive cultivation it will generally be best carefully to work out and install a thorough system of drainage.

Results of Liming

Under present conditions the use of lime demands more consideration in many districts. Some crops make a marked response when lime is applied to an acid soil.

Most responsive are cabbage, cauliflower, broccoli, mustard, asparagus, beet, celery, leeks, lettuce, onions, parsnips, egg plant, peppers, musk melons, salsify and spinach. Less responsive are carrots, cucumbers, kale, peas, pumpkin, marrows and rhubarb. Showing no response are kidney beans, sweet corn, parsley, potato, radish, tomato, turnip, and water melon.

To produce and maintain that friable condition so necessary when sowing fine seeds, or to obtain the best results from a soil with a crop of any kind, applications of lime are most effective. Again, to obtain the best results from the use of such fertilisers as superphosphate and sulphate of ammonia, there must be a sufficient supply of lime in the soil to enable the necessary reactions to take place.

For the prevention of the club root disease fungus, which attacks plants of the cabbage family, applications of lime are effective if at the same time good drainage is provided. Used too liberally, lime has been proved to encourage the development of the disease known as potato scab, and has reduced production in such crops as watermelons and blue lupin.

Lime (calcium) is found in nature as limestone (carbonate of lime). Broken up and ground to a fine powder, it is the class of lime commonly used in agriculture. Burnt lime has the carbon driven off and is known as quick lime; it is lighter in weight, absorbs water readily, and then breaks down into a powder, a process known as slaking. Such lime is caustic and more aggressive in its action than the ground, raw limestone.

On heavy clay loams of an acid character, when used for the intensive production of market garden crops, four ounces of finely-ground carbonate of lime may be applied per square yard annually with advantage to the mechanical and chemical condition of the soil. This amount is equal to about half a ton of lime per acre. When crops of the cabbage family are to be grown, or others preferring an alkaline soil, the dressing may be increased substantially.

The action of the lime is temporary. What is not used up gradually leaches out and is carried away in the storm water. Lime is usually broadcast on the surface of the land after ploughing, and then harrowed in, or is applied after digging the ground and then cultivated in.

Uses of Humus

In many instances where intensive cropping is practised it is difficult to maintain the necessary supply of humus in the soil. The decaying organic matter which gives a fertile soil its dark colour and light absorbent character is known as humus, and there are few crops which may be grown satisfactorily without a generous supply of this material. Crops which are required to make a vigorous growth, such as cabbage, rhubarb, asparagus, etc., require a heavy dressing to be turned under before planting, but for root crops and such crops as tomatoes this treatment results in coarse, fibrous roots and rank barren plants. They are therefore grown in succession to the former class, and do very well on what remains of the manures applied for the previous crop.

In the comparative absence of stable manure, upon which it was usual to rely chiefly, it is necessary carefully to conserve what may be available in the way of farm and fowl manure, fallen leaves, and vegetation, such as grass and weeds mown before seeding, by stacking it carefully in a compact heap to decay. Seaweed is excellent when obtainable. Supplies of this kind are sometimes supplemented by growing a green cover crop of oats and horse beans, barley and vetches, lupins or mustard, etc., for turning under.

Early preparation is desirable for heavy soil. Where soils are light the disintegration of humus is more rapid, and preparation of the soil and planting may follow more closely. Because of the "hungry" nature of light land it is often advisable to sow it down in grass and graze it for three years after cropping it for a similar period. In the absence of adequate supplies of humus a half ton per acre of blood and bone or fish manure may be turned under. Other materials under this heading which are of great value are soot and wood ashes. As the nitrogen in the former and the potash in the latter are highly soluble, these materials must be stored in a dry place.

Balancing Plant Foods

Modern conditions, which have greatly reduced the available supplies of manures, have greatly improved the quality and supply of commercial fertilisers. Soil fertility is greatly enhanced by the timely application of suitable quantities of fertilisers. In the most convenient form they enable one to adjust the balance of plant foods in the land to the requirements of almost any crop, and to do it at any time as weather or other circumstances may make it necessary. Local experience and close consideration of all the circumstances are necessary to use these fertilisers with the greatest economy and success.

Where the quantity applied is small it is often best drilled along the line to be planted or sown alongside the seed drill. Further applications are made, as necessary, by drilling it in alongside each row in the growing crop or broadcasting it down the alleys. Where the rate of application is large, and especially where the crop rows are close, it is often advisable to broadcast the fertilisers and work them in a week or two before sowing or planting the crop. The tendency is to feed the crop heavily, in which case it is particularly important that the plant foods should be well balanced.

A fertiliser which is too often under-rated is potash. Its effect is usually less spectacular than that of nitrogen and phosphates, but it is nevertheless important. To the increased growth obtained by feeding nitrogen it maintains the firm texture and quality which is often otherwise lost, and the plant, because of the softness of its foliage and young vigorous growth, falls a victim to high winds or fungous diseases. This is specially liable to happen in a light, free soil.

The Planting Season Passes

WITH but three months to run before the end of the season, finality should be attained with any plans which are being made for taking advantage of the present planting season. In doing this one should avoid as far as possible extreme situations, and in carefully selected localities should plant those trees and shrubs which are suited to the soil, climate and object in view.

Extreme situations are a shallow soil overlying rock, or a water-tight "pan" where conditions alternate between extremes of moisture and drought, or a light, over-drained soil in a warm position. Useful plants may be found suited to most conditions, but on the former, most trees will soon become "stag-headed" or stunted, while on the latter the choice of suitable plants is confined to a comparatively small number, which, while interesting, are of limited utility.

Localities on the farm most suitable for planting trees and shrubs are the vicinity of the homestead, where shelter, shade, fruiting and ornamental trees are required, shelter belts and hedges in exposed positions, or plantations on broken country, or in isolated positions where it is better to grow fence posts and stakes rather than cart them there. With good management these plantations will supply firewood as well as useful timber for the farm or for sale.

Hedges And Shelter Trees

ON POOR land deficient in humus and in high country or on sand hills along the coast, species of pine are generally most suitable for shelter planting. The Bishop's pine of California, *Pinus muricata*, is of moderate height, well furnished with foliage about the base, and is for that reason often planted on the windward side of species developing bare trunks. Under somewhat similar conditions species of *Acacia* grow into useful timber for firewood and posts.

On good land pines should be planted with caution, as they are inclined to grow coarse and unwieldy. In such a situation cypress, such as *Cupressus Lawsoniana* and *C. torulosa*, associated with eucalypts, such as *Eucalyptus Macarthuri*, *E. viminalis* and *E. fastigata*, are usually appropriate. The popular macrocarpa cypress is an excellent timber tree, but only when it is of a strain which grows straight boles. If it is then planted in a plantation on alluvial soil of fair quality that is well drained good results may be expected. Nevertheless, the ordinary strain provides good shade and shelter on warm slopes, and is useful for the protection of stock, as, for instance, after shearing.

In specially dry districts where the cypresses mentioned are not satisfactory, consideration might well be given to the species *Cupressus arizonica*, recently introduced at Canterbury Agricultural College. Information regarding this species will be found in the "Journal" for October, 1937.

For the protection of gardens and orchards the Lombardy poplar interplanted with barberry or privet often forms appropriate shelter, and requires little attention. For really stock-proof hedges we have at present nothing to beat seedless barberry, a variety of *Berberis vulgaris*, and boxthorn, *Lycium horridum*, the latter being especially prized in localities exposed to heavy salt-laden winds so long as the soil is light and well drained.

On poor land under pine trees *Elaeagnus japonica* in many places makes a close shelter hedge of great value on the windward side; on better land its rank growth is a troublesome habit. Selections along these lines, after considering local experience, carefully planned and planted, with adequate protection until established, become valuable assets at a comparatively low cost.

Ornamental Plants For Extreme Conditions

SUCCSSEFUL planting under this heading depends very largely on selecting trees and shrubs suitable for the position they are to occupy. For good, well-sheltered land and moist slopes shaded for the greater part of the day, there are a large number of plants from which to make a selection. In most gardens, however, there are important positions not so easily catered for.

In exposed positions subject to high winds the native evergreens, such as species of *Pittosporum, Olearia, Metrosideros, Veronica* and *Cordyline* flourish, and not only that, it is there they are healthiest and flourish best. These and many other native plants are admirably suited to the most exposed conditions here so long as the land is fair to good and is usually well supplied with moisture.

On the sunny side of a shrubbery or plantation shrubs are often found suffering from the dry, hot conditions —Laurustinus and rhododendrons with leaves dry and silvered through drought and the attack of insects. Such plants, are, like the majority, suited to positions where they receive full sun for only a few hours in the morning or afternoon. Plants which flourish best under the hot, dry conditions are species of *Acacia, Callistemon,* and *Casuarina* from Australia, *Fremontia, Garrya, Ceanothus* and *Romneya* from California, the fragrant Spanish broom, *Spartium junceum,* and also the varieties of broom with flowers of many colours listed under the generic name of *Cytisus, Helianthemums* and *Cistus,* the sun roses and rock roses of Southern Europe, *Ceratostigma Willmottianum* from China, the brightly-berried firethorns, *Pyracantha,* and *Pittosporum crassifolium, Metrosideros tomentosa* and *Dodonea vicosa,* which are among the most useful of our native plants.

Plants are unable to grow without light, but many are able to get along fairly well without sunshine. For situations in full shade a selection may be made from the following: — Tree ferns and many others, *Coprosma, Brachyglottis,* and *Macropiper* among our native plants; *Aucuba japonica,* the spotted laurel, *Euonymus japonica,* the spindle tree of Japan; *Fatsia japonica (Syn. Aralia Sieboldii), Ligustrum, Osmanthus, Nandina, Kerria,* natives of Japan; *Hydrangea and Fuchsia,* varieties; *Myrtus communis* and *M. Ugni, Symphoricarpus racemosus,* and *Ribes speciosum.*

The present season is very suitable for making additions and adjustments to plantations and hedges, and also the garden and orchard on the farm. In the drier localities especially, early planting is desirable.

—Wm. C. HYDE, Horticulturist, Wellington.

Registration Of Nurseries

A. E. MORRISON, Solicitor, Department of Agriculture.

THE NURSERY Registration Regulations, 1939, replace the former regulations governing the annual registration of nurseries and the sale of all plants, shrubs, and trees therefrom for the purpose of ensuring that they are free from disease at the time of sale. Although extensively rearranged, the new regulations substantially repeat the provisions of the former regulations, but incorporate certain additional matter.

The definition of "sell" has been enlarged to include "offering for sale by means of a printed or published or written advertisement or by other means." Provision is made that no prescribed tree or plant shall be sold or offered for sale for replanting unless it has attached to it or to the package containing it a tag or label bearing thereon the name and address of the occupier of the nursery where the tree or plant was raised or grown.

Occupiers of registered nurseries who do not desire a continuation of registration in any year must notify the Director of the Horticulture Division of the Department of Agriculture of their desire not later than the 30th day of April in that year.

Where, in the opinion of the Director, land adjacent to a nursery belonging to an applicant for registration is infected with disease, the Director may withhold the granting of a certificate of registration of the nursery until the applicant has taken such steps as are necessary in the opinion of the Director to prevent the spread of disease on or from the adjacent land.

Under the provisions of the revoked regulations a nursery could be registered unconditionally or conditionally according to whether the nursery was or was not found to be free from disease on inspection for the purpose of registration. Where a nursery was conditionally registered, specified kinds of prescribed plants, shrubs, or trees could not be sold therefrom unless and until they were treated as prescribed in the presence of an Inspector and were supported by a treatment certificate issued by him.

Once conditional registration had been granted, the former regulations contained no machinery whereby such registration could be converted into unconditional registration when the disease on account of which registration was made conditional had been effectively eliminated. This defect is accordingly remedied by the inclusion of an appropriate provision in the regulations under notice.

APIARY NOTES

Contributed by Officers of the Horticulture Division

Winter Requirements and Shelter

DURING the colder months it is essential that the hives should be kept as warm as possible and the apiary protected from cold winds. Nothing is more detrimental to the health of the colony than damp mats and combs during the dormant period.

After heavy rains the hives should be quietly examined without disturbing the bees to see that the mats on top of the frames are dry. Should any be found moist, they should be immediately removed and replaced by a dry mat or mats. At the same time the cover of the hive should be examined to ascertain the reason for any dampness.

It will sometimes be found that a small crack has been overlooked and that through this the rain has leaked into the hive. Any defective covers should be replaced by sound ones. Faulty covers can then be taken to the workshop and mended. Sometimes these cracks can be filled with putty, and, when given a good coat of paint, will be again leak proof.

Good Mats Essential

Clean corn sacks, if cut to the right size, make excellent mats, but perhaps an old thick carpet is better. All mats must be cut to fit exactly inside the cover. Should any part overlap, it will become wet during the rainy season. A zinc queen-excluder makes an excellent gauge for the cutting of mats. If corn sacks or similar material are used it would be best to use two or even three of them in the colder parts of the Dominion.

Sound Hives

Not only should the covers of the hives be kept free of cracks, but the hive itself and the bottom board should be kept sound so that no moisture or cold draughts can injure the bees. Reasonable warmth and sufficient stores during winter will mean strong healthy colonies in the spring.

Shelter

The ideal situation of the apiary should be where it is sheltered from prevailing winds and obtains the maximum amount of sunshine available.

Beginners are often inclined to give the hives too much shelter by placing them right under thick trees or hedges. By so doing they prevent the bees getting the sunshine so necessary for their health. Bees kept too shaded are inclined to become cross, even in the spring and summer months. Hives should therefore be placed far enough from hedges to allow access all around.

All bottom boards should be placed on four bricks or two pieces of 4in x 3in timber to allow a current of air to pass right under the hives. Grass and weeds should also be kept down, otherwise the entrance and bottom boards become damp and mouldy.

Beginners who read bee journals published in America are sometimes concerned at the elaborate precautions advised in that country, such as packing the hives in boxes or wintering them in cellars. These precautions are necessary only in extremely cold climates and do not apply to New Zealand conditions, where our climate is comparatively mild.

If the advice given above and that given by our local writers is carefully followed there should be no doubt of the bees wintering well.

Permanent Shelter

Bee-keepers taking up new sites for their apiaries are frequently concerned about shelter. This can be overcome by putting up a plain wire fence around the site. This should not be strained tight. Then, by cutting scrub (such as ti-tree) and interlacing it between the wires a good temporary shelter from the prevailing winds will be made. This is, however, the time of the year to consider the planting of quick-growing hedges or trees to provide permanent shelter.

In deciding the kind of scrub or tree to be planted for permanent shelter one of the first considerations will be quickness of growth in order to attain shelter as early as possible, but at the same time the value of nectar-producing plants that would be of service to the bees should not be lost sight of, especially those which flower either in early spring or late autumn, when every little bit gathered will be of use either in brood rearing or in augmenting winter stores.

Making a Choice

In making a choice one must, of course, be certain that the plant selected will grow in the district. In many parts of the North Island one of the quickest growers is the Lopantha Albizzia. This is often mistakenly named Acacia lopantha, or the "pussy wattle." This flowers in the second year from May to July or August, and is greatly visited by the bees for both nectar and pollen. The seed of this plant has a very hard husk, and should be steeped in very hot water before sowing.

If it is to be made a permanent shelter it should not be encouraged to grow too high, but should be kept topped to ensure a thick growth close to the ground. Before planting, bee-keepers should, however, consult with a local nurseryman or with the local Apiary Instructor, who will be in a position to advise them as to the most suitable shelter for their district.

—G. V. WESTBROOKE, Apairy Instructor, Hastings.

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Work For Early Hatching

EXPERIENCE has shown that August and September are the best months to hatch out chickens, August for the heavy breeds and September for the light breeds.

The 1936 census returns showed that 166,550 householders in New Zealand kept poultry. The average number of birds in flocks was 23.3 and 65,669 householders kept under 12 birds. From these figures it will be seen that the great majority of poultry-keepers require to rear only a few pullets each year to keep their flocks up to the usual number.

Those poultry-keepers who wish their flock to supply the home table with fresh eggs during the season when eggs are dear must rear a certain number of pullets each year, and if these pullets are hatched during August or September and carefully reared they should provide good egg production during April, May, and June of the following year.

The poultry farmer who requires a large number of pullets each year must start his hatching operations earlier, for experience has shown that chickens hatched after the end of September are seldom profitable.

Poultry-keepers requiring a large number of pullets usually start saving eggs for incubation as soon as the hens begin to lay after coming through the moult. Chickens hatched at this time of the year, especially of the light breeds, can hardly be expected to produce many eggs during the next dear season, for in all probability they will began laying early in January and will stop after a few weeks and then go into a moult about the end of March or April.

However, the early-hatched birds usually develop better and make more desirable breeders later on. For these reasons, when it is found that the required number of pullets cannot all be hatched during August and September it is much more desirable to start early so that hatching after the end of September will not be necessary.

Examine Breeding Birds

The best time to select breeding birds is immediately before they start to moult. Even where this has been done it is advisable to handle all birds again before mating them for the breeding season. Some hens run to fat during moulting or just after, and in such condition are of little use as breeders. Again, some hens lose condition during that period and will be all the better for a little special attention, but if it is found that the moulting process has taken too much out of them a lack of constitutional vigour is indicated, and such birds should be discarded from the breeding pen.

All birds should be carefully examined for insects. It is not unusual to find male birds, especially old birds, infested with insects, and in such condition they cannot be expected to give the best results.

A good method of ridding the birds of lice is to place a thin line of nicotine sulphate along the top of the perches at dusk and before the birds go to roost. The heat of the bird's body causes the fumes from the nicotine sulphate to rise and destroy the insects. Care should be taken, how-

DEPARTMENT OF AGRICULTURE

WALLACEVILLE POULTRY STATION

FOR SALE

Now booking orders for eggs, day-old chicks and ten-weeks-old pullets, White Leghorn, Langshan and Australorp (Utility Black Orpington), from recently imported stock.

For full particulars apply to:—
THE POULTRY OVERSEER,
Veterinary Laboratory,
Private Bag to Wallaceville,
WELLINGTON.

ever, to ensure that any dust or oily substance is removed from the perches before applying the nicotine sulphate.

Hens sometimes become affected with cloacitis, or "vent gleet." This is an ulcerative condition of the cloaca and vent, and is accompanied by a very offensive odour. This trouble is at times difficult to detect unless the birds are handled and examined. If any birds are found to be so affected they should be separated from the flock, the affected tissue removed, and the wounds washed with an antiseptic twice daily for several days. If the trouble does not clear up the bird should be destroyed.

When Fertile

Though it is possible for eggs to be fertile in 24 hours after stock have been mated it is generally considered desirable to have the birds mated for at least a week before saving the eggs for incubation. Quite a number of large poultry-keepers mate up their pens as soon as the hens come through the moult. This is a good idea, as it gives the birds time to settle down and become well acquainted.

One of the best systems of breeding is to mate good, selected second-year hens with well-developed cockerels which have been bred from proved parents. Though some cock birds, even in their third and fourth years, give good results, cock birds as a rule cannot be depended upon, especially early in the season, to give a high percentage of fertility. However, those exceptionally vigorous old hens and cock birds are valuable on any plant, and should be specially mated and their stock specially marked for future breeders.

Selecting Hatching Eggs

Eggs for hatching should be selected with great care. The class to select is one that you wish your future pullets to produce, that is, eggs of good size, shape, colour, and texture of shell. While very large eggs are difficult to incubate, it is never desirable to set eggs under 2oz in weight. A good-shaped egg is wide at the top, which gives the chick room to make the necessary developments and turn at hatching time.

The colour should be watched. Some breeders do not give this point due consideration, for it is not uncommon to find Leghorn eggs varying from a cream to even a light brown, when they should be a pure white, and, conversely, eggs that should be a dark

OVER 5 EGGS PER BIRD PER WEEK

DESPITE RIGOROUS WEATHER CONDITIONS

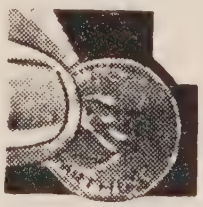
THE next few weeks are likely to prove treacherous to poultry farmers. Winter will be here in earnest and it needs only one or two really cold snaps to put birds off laying to a greater extent than usual.

But you can guard against these sudden cold spells by including Karswood Poultry Spice (*containing ground insects*) in the mash each day. This will build up the birds' resistance to chills, keep them fit, close in feather and enable them to continue laying abundantly despite rigorous weather.

NO matter how few or how many birds you keep, it will pay you hand-over-fist to put them on Karswood. Half-a-million poultrykeepers know this is the truth, **particularly** in the winter months when eggs bring MOST profit. Read the good news this poultryowner tells — then follow his lead **TO-DAY**:—

"I have been keeping hens for over 3 years and have used Karswood Spice regularly as I have great faith in it. During the winter months, particularly, I find it invaluable for holding the egg yield and keeping the flock in trim. I have 14 R.I.R.'s and am averaging 10 to 12 eggs a day from them, even though in this district it is snowing and has been freezing hard these last five days. The birds have enough to eat and of the right food, plus the daily dash of Karswood Spice. Taking it all round, I am making a handsome profit from eggs while the market supply is short."—A.T.

(Original letter on file for inspection.)



¼D. A DAY FOR EVERY FIVE HENS IS ALL IT COSTS YOU

1/- packet of Karswood supplies 20 hens for 16 days; 2/- packet supplies 40 hens for 16 days; 7 lb. tin (12/6) supplies 280 hens for 16 days. Try a shilling packet.

KARSWOOD POULTRY SPICE

Increases egg-production without forcing, because it contains ground insects, but no cayenne pepper, &c.

brown are often found to be of a lighter colour. They have lost a good deal of their true character from the want of proper selection.

The texture of shell is a most important character, as it indicates the physical condition of the hen that laid it. For instance, ridges around the centre of the eggs often indicate that the hen is over-fat. Thin texture indicates that the constitution of the bird is lacking, and such eggs usually dry down too much and are easily broken.

When holding eggs for incubation it is well to keep them in a room where the temperature does not vary too much. During very cold weather it is advisable to cover them over with a towel or blanket at night. The earlier eggs are set after being laid, the better. It is seldom that good results are obtained from eggs over ten days old.

Development of Embryo

When a fertile egg is exposed to correct incubating temperature the embryo develops somewhat as follows:

During the first 48 hours the lines of the head and the body become visible, blood also appears in lines along the surface of the yolk, traces of the backbone are to be seen, and indistinct lines show where the wings and large blood vessels are later to appear. During the third day the auricles of the embryo heart begin to work, the brain and eyes begin to develop, and the spine takes form prior to the uniting of these organs. The arteries and veins can also be seen at this stage. In short, an embryo, the shape of which may be clearly seen, is now in existence.

The pupil of the eye is visible on the fourth day, the head is enlarged, the wings and thighs have taken form, and the outlines of the stomach, intestines, and liver become distinct. Before the close of the fourth day respiration is apparent. During the fifth day the lungs take definite form, and muscles appear. The heart is moved forward and the abdomen expands. On the sixth day the gall bladder becomes visible. The liver is more plainly seen, and the growth of the spine is extended.

On the seventh day the skin and feather cells begin to appear, and the beak gradually takes shape. On the eighth day the brain, wings, thigh, and shanks have taken form. The bones begin to take form and portions of them assume colour on the ninth day. During the tenth day the muscles of the wings are completed and the feather cells much developed. On the eleventh day the arteries become distinct, and the embryo takes shape as a young chick. During the twelfth and thirteenth days blood veins and arteries invade the whole structure.

On the fourteenth day the internal organs are well developed, and if the chick is removed from the shell it will gasp for breath, and the body will move. From the fifteenth to the nineteenth days the chick continues to grow and is fed from the yolk, which is attached to the navel. As the food is absorbed from the yolk the yolk takes up extra matter from the albumen. Gradually the yolk is drawn into the body of the chick. This process should be completed by the twentieth day.

On the point of the upper part of the beak is a sharp little horn or scale. Just before the chick hatches, it turns in the shell by a movement of the legs, and by a movement of the head and wings the sharp little horn is pressed against the shell, which has become very brittle as the result of incubation and is easily broken. When the chick has made the complete turn it is able to roll out. Good, strong chicks will make this turn in seven or eight hours, but the average chick takes a little longer.

Order Early

Poultry-keepers desiring eggs, day-old chickens, or eight to ten weeks' old pullets during the coming season would be wise to place their orders early in order to save disappointment. If the various breeders know what is likely to be required they can usually make arrangements accordingly, and this is necessary where perching pullets are concerned.

—C. J. C. CUSSEN, Chief Poultry Instructor, Wellington.

Slaughterings of Stock

THE following return of slaughterings of stock at meat-export slaughterhouses and abattoirs for the twelve months, May, 1938, to April, 1939, inclusive, has been compiled by the Livestock Division:—

District.	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat-export Slaughterhouses—						
Auckland	151,042	561,195	405,264	221,558	921,204	420,915
Poverty Bay-Hawkes Bay	46,254	41,337	754,333	274,625	1,355,921	41,859
Taranaki-Manawatu ..	82,457	238,073	539,809	229,001	1,442,185	241,578
Wairarapa-Wellington ..	33,895	27,428	559,207	194,707	1,080,516	53,522
Totals	313,648	868,033	2,258,613	919,891	4,799,826	757,874
Abattoirs	115,893	37,561	380,969	218,439	67,317	116,255
North Island Totals ..	429,541	905,594	2,639,582	1,138,330	4,867,143	874,129
South Island						
Meat-export Slaughterhouses—						
Nelson-Marlborough ..	346	10,549	40,222	10,001	211,156	14,929
Canterbury	13,247	41,678	629,310	475,197	2,701,903	43,497
Otago-Southland ..	7,757	44,387	382,204	305,316	2,089,517	5,780
Totals	21,350	96,614	1,051,736	790,514	5,022,576	64,206
Abattoirs	57,142	14,655	267,258	134,241	42,955	28,043
South Island Totals ..	78,492	111,269	1,318,994	924,755	5,045,531	92,249
Dominion						
Meat-Expt. Slaughterhouses	334,998	964,647	3,310,349	1,710,405	9,802,402	822,080
Abattoirs	173,035	52,216	648,227	352,680	110,272	144,298
Grand Totals	508,033	1,016,863	3,958,576	2,063,085	9,912,674	966,378
In addition, the following stock were slaughtered at rural slaughter-houses during the year ended 31/3/39 .. .	84,351	2,053	220,560	unknown	19,976	28,334
Same Period, 1937-38: Meat-export Slaughterhouses and Abattoirs ..	500,274	1,062,948	3,122,380	1,604,317	9,850,247	1,057,188
Rural Slaughter-houses to 31/3/38	87,873	2,179	216,338	unknown	19,545	28,293
Same Period, 1936-37: Meat-export Slaughterhouses and Abattoirs ..	427,444	1,044,942	2,580,646	1,338,674	9,558,420	981,930
Rural Slaughter-houses to 31/3/37	88,435	1,972	213,799	unknown	19,883	27,163

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

The reunion dinner of the North Taranaki Y.F.C. touring party.

R. H. Charters, photo.

North Taranaki Y.F.C. Tour

K. PHILLIPS, Hon. Secretary, Urenui Club.

TWENTY-FIVE members took part in the recent tour of the North Island organised by the North Taranaki Young Farmers' Club. The tour was arranged with the object of giving us the opportunity of comparing our own district of Taranaki with other parts of the North Island and of having a jolly fine time in seeing the countryside at practically a nominal expense.

The first stage of the tour was to Palmerston North. The journey was broken at Kai-iwi, where a visit was paid to Mr. Moore's "Bushy Park" stud farm. Here we saw the best stud Hereford cattle on our tour.

At Palmerston North we visited the Plant Research Station, one of the most valuable institutions in New Zealand to farmers. Of the different breeds of clover seen it was apparent that the only clover to sow for permanent pasture is the Mongomery strain. Massey College, with its 1,900 acres, offers instruction in all branches of farming to the many hundreds of students attending.

Visits were made to the Seed Testing Station and various farms around Feilding, and particular interest was taken in the Polled Angus cattle and stud rams at Mr. Johnson's farm. The journey from Palmerston North to Wellington was marred by wet weather, but we arrived in Wellington according to schedule. Sight-seeing occupied all the afternoon, one of the outstanding places visited being the Massey Memorial at Point Halswell.

Stay at Wellington

Among the secondary industries inspected was the Radio Corporation works, General Motors, and British Australian Paint works. The city milk depot, where thousands of bottles of milk are sent out daily, was a revelation to the tourists. It seemed incredible that so much milk is consumed in a day.

The journey from Wellington to Masterton gave us our first sight of really dry country, which was decidedly worse than Taranaki. There was no green feed anywhere. Our stay at Pahiatua, although the shortest, was

most enjoyable. Here we were met by members of the Y.F.C. movement. A field day had been arranged, and a demonstration was held on judging a Jersey cow and a bull. There was also a contest with local members in a tug-of-war.

After lunching at Dannevirke we were met by Mr. Jim Palmer, well known to many as an old boy of the New Plymouth High School. Mr. Palmer took us to Mr. Phillip's property, where we spent a most enjoyable afternoon. One thing that impressed us a great deal was the successful harnessing of water power by Mr. Phillips. The power is gained by the propelling of a huge water wheel. Afternoon tea was served by Mr. and Mrs. Phillips. Mr. Palmer and his Young Farmers also organised a dance for us.

The Seed Testing Station at Hastings proved Mr. Palmer's statements about the various clover trials we had visited. Watties Canneries at Hastings greatly interested us.

Crops of Maize

On the road between Hastings and Napier I was impressed by the numerous crops of maize, indicating that Hawke's Bay farmers realise the value of this important fodder as feed in the dry season. Our stay at Napier was mainly a break to allow us to view the many developments since the tragic earthquake of 1931. In particular our was drawn to the reclaimed land at Port Ahuriri. An idea of the size of the work may be gained from the fact that some 7,500 acres are under drainage contracts estimated at the present time to have cost the Government £170,000.

A view of the touring party examining some old farm machinery.

At Taupo our visit to Huka Falls and Arataitia Rapids revealed the secret of their popularity with the overseas tourist. Between Wairakei and Horo Horo one could not help but notice the Government's activity in the planting of pines; in all, 172,000 acres are planted in pines.

At Horo Horo we were entertained by the Y.F.C. members at dinner, and in the afternoon we were the guests at their annual sports. We were greatly impressed by the welcome we received from a band of Maori lads performing a well-executed haka.

We spent the week-end at Rotorua. The enjoyable but rather enervating Blue Baths were the main attraction. Our visit to Whaka was one of the high-lights of the tour. Spending all the morning among hot pools, mud volcanoes and geysers was a novel experience.

Visit to Ruakura

Our next journey was from Rotorua to Hamilton. On the way there was ample evidence to show the effect of the dry spell. Our visit to Ruakura Experimental Farm gave us an idea of what these institutions are doing in the way of farming lands. It would benefit the majority of Taranaki farmers to visit Ruakura and see what a model cow shed really should be. Water in every bail was not uncommon to the average farmer, and the general layout of the whole shed gave the impression of a palace rather than a cow shed. A visit to the piggeries showed us that they realise the value of breeding on the right lines to produce the finished article. The experimental plots were also looking their best.

We visited a farm at Matangi which has been worked by Mr. Mortimore for only four years. His farm, 47 acres in size, was showing a wonderful growth of grass for this time of the season. To milk 53 cows and average 360 lbs. of fat to the acre is an indication of his ability as a dairy farmer.

In the afternoon we visited the New Zealand Co-operative Dairy Company's piggeries at Te Awamutu. Of 80 acres, this farm is the largest pig farm I have seen, and it has every modern appliance imaginable. There are 400 breeding sows on the farm, the majority being Tamworths and Berkshires, with a few Large Whites and

The touring party during a visit to one of the farms.

Devon. Personally, I think the layout of the fattening pen should be copied by more dairy farmers, as it offers all the facilities needed for this particular work. The annual output of this farm is 2,000 pigs. Our last call was paid to Mr. Rhodes's farm at Paterangi.

I would like to thank our manager and chairman for their untiring efforts in attending so efficiently to our wants and needs throughout this tour. I would also like to thank all those farmers, including their women folk, for the splendid hospitality they extended to us while on tour.

Marton Club's Successful Gala Day

A GALA DAY was held by the Marton Club on 22nd March on Mr. Geo. Lampp's property, Tutaenui Road, to demonstrate to the public the capabilities of the members, and also to mark the successful termination of a year's activities comprising lectures, field days, and social functions. The main attraction on the morning's programme was tractor driving. The afternoon events were particularly entertaining. Competition was keen, and the items were of a different nature from the usual sports.

Mr. R. Shields, Chairman of the Marton Club, in extending a welcome to the visitors, dealt with the growth of the movement generally throughout the Dominion and in the Marton district in particular. The Marton Club had been formed 12 months, he said. The membership was now 52, and the club hoped to reach 150 before the next anniversary. One of their chief endeavours was to educate the young farmers in the more modern phases of farming, and with lectures and demonstrations and the assistance of the older farmers this object would be achieved. It was their aim to foster closer friendship and co-operation between town and country.

Fig. 1.—Competitors in the sawing competition waiting for the starter's gun.

Fig. 2.—The committee are shown as follows:—Fifth from the left, D. Gordon; standing, front row, H. Kimpton (2nd from the right), R. Shields (chairman) and A. B. Marshall (secretary). At the annual meeting the following day R. Shields retired from the chair, A. B. Marshall being elected chairman and H. Kimpton, secretary.

The gala had aroused the interest of a number of young farmers present, and he hoped that they would come along to the club's annual meeting and join up with the movement. Club members owed a debt of gratitude to Mr. Geo. Lampp for placing his property at their disposal for the day, and also for assisting in the preparatory work. Their thanks were also due to the ladies for their kind assistance in providing luncheon and afternoon tea, he also wished to thank all others who had assisted.

Wonderful Progress

Mr. E. B. Gordon, M.P., congratulated the club on the wonderful progress made during the past 12 months.

The Y.F.C. movement was an excellent one, he said, and although it had been in existence only a few years members could already see the advantages that it offered. Members had shown great aptitude in judging stock at the recent Marton A. and P. Show. The whole movement was a stepping-stone in the direction of making good farmers. It was educating its members so that they could take their place in the ranks of the primary producers of the Dominion with honour to themselves and to their parents. The scheme was for the benefit of the country generally. Mr. Gordon congratulated members on the excellent programme that had been prepared.

Mr. A. L. Wheeler, of Leedstown, Marton, gave an address and a practical demonstration on Romney Marsh sheep.

Sports Results

Post-hole Digging (Competitors had to dig a 2ft 6in hole and erect a post).—L. McLeay, 1; P. Shannon, 2.

Putting the Shot.—G. Lourie, 29ft 1in, 1; F. Smith, 28ft 11½in, 2. (Eighteen competitors).

Double-hand Sawing.—First heat: M. Morrison and R. Shields, 1; C. B. Anderson and R. Carter, 2. Second heat: H. Kimpton and P. Shannon, 1; K. Coles and W. Bush, 2. Final: C. B. Anderson and R. Carter, 1; H. Kimpton and P. Shannon, 2.

100yds Handicap.—W. Bush, 1; R. Shield, 2; L. McLeay, 3. (Thirty-five starters).

Chain-Stepping.—Won by G. Morrison, who stepped the correct distance.

Tug-o'-War.—After three pulls the Farmers' Union team beat the Young Farmers' Club team, the event proving a great tussle.

There were fifteen entries in the tractor driving, which took place in the morning. The finalists for the afternoon were E. W. Barnett, P. Shannon, D. Gordon, and A. Nitschke. This event was won by E. W. Barnett, with A. Nitschke second, and D. Gordon third. Mr. V. W. Fullerton-Smith gave an exhibition of driving into a gravel pit and performing some very clever driving. A demonstration of the use of a flame-thrower on gorse was given by Mr. W. Emmett.

The luncheon and afternoon tea were greatly appreciated. The committee responsible for the gala day were Messrs. R. Shields (chairman), A. B. Marshall (secretary), D. Gordon, L. McLeay, and H. Kimpton.

Growing Good Crops Of Wheat

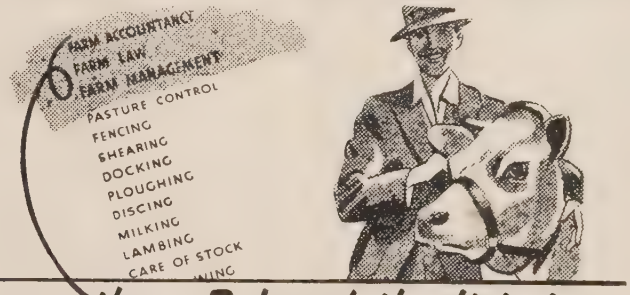
D. H. BOWIE, Papakaio Club.

IN THESE days of world unrest the importance of an isolated country like New Zealand being self-supporting in its food supplies must appeal to all thinking people. As wheat is one of the main items of food it is very necessary that a sufficient quantity for the country's needs should be grown. During the Great War the importance of this was recognised in Great Britain, where the farmers were compelled to grow a certain amount of wheat. The Government employed tractors, working night and day seven days a week, to plough the land and so assist the farmers to grow the required quantity.

In New Zealand a great deal has been done in late years by the Wheat Research Institute, the Department of Agriculture, and Lincoln College. Some of the more important work has been the determination of the best strains of wheat for baking, the best strains of wheat for different districts, and the most profitable manures to use.

Good Cultivation

Wheat growing requires good cultivation of the soil, and to gain the best results lea ground should be ploughed two or three times, with cultivation between times to check the growth of weeds and conserve the moisture. Lea ground should be skim ploughed in the summer to let the air get through it, and for the earlier wheats, deep ploughed in April or May. A slight cloddiness of the seed



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bed is not a disadvantage, as during the winter this serves as a protection for the young plant, and when the field is rolled and harrowed in the spring the clods are easily broken.

In North Otago Hunters and Dreadnought are recognised as the most suitable for autumn sowing, and this last season has produced some phenomenal crops of Dreadnought, up to 90 bushels to the acre being recorded. This wheat seemed to be little affected by the dry spell in the latter part of the season.

Tuscan and Cross 7 are recognised as being more suitable for spring sowing. These may be sown on turnip ground after the turnips have been eaten off, but may also be sown in the autumn if desired. Cross 7, which is a new wheat, and which was bred at Lincoln College, has one great advantage over Tuscan, it has not the tendency to lodge. In some experimental plots in this district where the two were grown side by side with the same treatment Cross 7 stood straight up and Tuscan lodged so badly that the plots had to be abandoned. In other plots the Tuscan had a bad lean, but there was very little variation in the yield.

Anyone who has handled wheat will agree that a good standing crop is a much better paying proposition than one which has lodged, although there may be a few bushels less in the yield. In our district, one crop of Cross 7, although sown at the end of September, yielded close on 60 bushels to the acre. It is recognised as one of the best baking wheats, and is a first-class wind resister. It has, therefore, found favour with the wheat grower. Jumbuch was tried out for several years, but although much sought after by the millers was not favoured by the growers because of the weakness of straw, and its non-resistance to wind.

Amount Sown

The amount of seed actually sown varies from 1 2-3 bushels to 2½ bushels to the acre, according to the variety of wheat and the time of sowing.

To counteract diseases such as smut, etc., wheat is always pickled before sowing. The dry pickles Agrosan and Ceresan are taking the place of the wet pickles formalin and bluestone, as experiments have shown that they are less injurious to the germination.

With regard to manuring, experiments have shown that 1cwt of superphosphate is the most profitable.

To harvest such wheats as Tuscan and Cross 7 the head harvester has been largely employed, but for wheats which shake, such as Hunters and Dreadnought, the old fashioned method of cutting and stooking and either stacking it or threshing out of the stook is still employed. Before it can be sold as milling wheat the wheat has to be passed by a grader.

Among the Clubs: Reports on Activities

Western Southland.

Lochiel.—Lecture by Mr. Colin Lindsay, Winton, on "Building Up of the Ewe Flock." An account of a successful field day held by this club will be included in next month's issue.

Thornbury. — Address by Sergeant-Major Sutton on "The Care and Attention to Horses." At the previous meeting Mr. C. Aberdeen, Veterinarian, gave a lecture on "Parasites of Sheep," and also related some of the more interesting cases to which he had been called personally. It was decided that the club meetings should be held every three weeks during the year.

Wyndham. — Address by Mr. S. Rice, on "Meeting Procedure." A club debate was held, the subject being "Tractor v. Horses," the speakers were:—R. McDonald, K. Townley and I. McDonald (tractors); W. Brown, F. Clay and T. Todd (horses). Mr. L. Harper acted as judge.

Eastern Southland.

Balfour. — Lecture by Mr. W. Faithful, Department of Agriculture, on "Seed Certification." Arrangements made for a debate.

Crookston.—Talk on "Fat Lamb Raising" by Mr. J. Brown. At the previous meeting Mr. W. Faithful, Department of Agriculture, gave a talk on "Winter Feeding of Sheep."

Five Rivers. — Talks by club members: "Border Leicester Sheep (M. Drummond); "Lucerne" (W. A. Gordon); "Barley" (C. R. Gordon); "Dorset Horn Sheep" (B. Selbie). Each talk was followed by a discussion.

Moa Flat. — Address by Mr. H. Duff, on "Pests and Diseases in Root Crops." At the previous meeting the same speaker gave the members a talk on his "Experiences at Lincoln College."

Otama.—Social committee set up; arrangements to be made for Club Ball. Club debate, the subject being "That Arable Farming is Superior to Pastoral Farming." Mr. D. Bruce, advisory president, presided, and Mr. J. Harper, Gore, acted as judge. The decision was awarded to the team advocating pastoral farming by a margin of seven points. After supplying a constructive criticism of each speaker, the judge gave a talk on the objects of debating.

South Otago.

Lawrence.—Lecture on "Afforestation" by Mr. Christie, Warepa.

Milton.—Sound films exhibited by Mr. J. M. Smith, Department of Agriculture.

Stirling.—Annual meeting. Officers elected: —Advisory President, Mr. A. Anderson; Club Chairman, R. Anderson; Secretary and Treasurer, L. G. Bell.

Central Otago.

Alexandria. — Arrangements for Y.F.C. and Junior Homemakers' Combined Ball. Officers elected at annual meeting:—Advisory President, Mr. J. Muir; Club Chairman, R. White, Secretary, L. C. Kinraid; Treasurer, E. Weaver.

Roxburgh. — Competition, speeches by members, subject, "Any Topic on Your Work," won by A. Bain. At the previous meeting a lecture was given by Mr. I. L. Nottage, Department of Agriculture, on "Fruit-Growing in the Cook Islands."

Upper Clutha.—Address by Mr. W. A. Scaife on "Sheep and the Consequence of Improper Feeding of Same."

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Dunedin.

Palmerston. — Business meeting. Programme drawn up for the ensuing year. Discussion on remits for Dominion Executive Meeting, J. Lowen (club member) being a delegate from the Otago-Southland Council. Election of two new members.

South Taieri. — General discussion on proposed ploughing match; decided to postpone the match, May being considered too early.

West Taieri. — Lecture by Mr. Taylor on "Parasites." At the previous meeting Mr. S. H. Saxby, Department of Agriculture, gave a lecture on "Pastures." The following officers have been elected for the year: — Advisory President, Mr. D. Grant; Club Chairman, R. J. Reid; Secretary and Treasurer, D. Doherty.

North Otago.

Five Forks. — Lecture on "Model Aeroplane Construction" by Mr. T. A. Sellwood. The following officers were elected at the annual meeting:—Advisory President, Mr. M. Austin; Club Chairman, E. Ewing; Secretary and Treasurer, I. D. Kingan.

Hampden.—Annual meeting. Officers elected: —Advisory President, Mr. H. Wilde; Club Chairman, H. Murcott; Secretary, J. C. Nicholson; Treasurer, A. Gillies.

Tokarahi.—Lecture on "Model Aeroplane Construction" by Mr. T. A. Sellwood. At the previous meeting Mr. A. L. Murray, Tokarahi, gave an address on "Recruiting."

South Canterbury.

Albury.—Lecture by Mr. I. L. McKercher on "Border Leicester Sheep." This was followed by impromptu speeches by members.

Arno.—Lecture by Mr. D. Wraight, on "Fertilisers and Pasture Management." The following officers were elected at the annual meeting: —Advisory President, Mr. C. Verity; Club Chairman, R. Lindsay; Secretary, T. Rolfe; Treasurer, G. McKenzie.

Cannington-Cave. — Lecture by Mr. L. Stumbles on "Stud Southdown Sheep." The following officers were elected at the annual meeting:—Advisory Members, W. Little and G. Squire; Club Chairman, T. Scott; Secretary, R. McKenzie; Treasurer, T. Little.

Fairlie.—Annual meeting. Officers elected:—Advisory President, Mr. J. E. Macdonald; Club Chairman, M. J. Kirke; Secretary, P. F. Carter; Treasurer, G. Coulter.

Geraldine.—Resignation of R. L. Volckman, secretary, received with regret; J. A. Thatcher elected to the office. Lecture by Mr. A. J. Burmister on "Wheat." At a subsequent meeting an address was given by Mr. E. N. J. Hannah on "Soil Fertility, Nutrition and Health," while at a previously unreported meeting K. Hibbs, V. Stonyer and H. Worner (club members) gave accounts of their tour of the North Island, rendered more interesting by photos taken on the trip.

Maungati.—Arrangements for a debate. Talk by Mr. W. Seaford, Department of Agriculture, on "Irrigation." At the previous meeting Mr. Grant gave a talk on the "Making of Ensilage."

Milford.—Arrangements for club dance. Club debate, the subject being "That the Town is better than the Country." Speakers: J. Woodhead, T. Crossman, J. Dale (affirmative); G. Crossman, G. Bolderston, A. Caithness (negative). Mr. G. Mulligan acted as judge, and gave the decision to the team supporting the negative. At a previous meeting Mr. W. H. Staniland gave a lecture on the "Dairying Industry," dealing mainly with the history of the industry.

Pleasant Point. — Club debate, the subject being "That Secondary Industries in New Zealand Should Be Encouraged." Speakers: R. S. France, D. Shires, E. Chapman (affirmative); O. Chapman, D. Gardiner, A. Talbot (negative). Mr. V. Wilson acted as judge, and gave the decision to the negative team. At previous meetings Mr. J. D. Wraight gave a lantern lecture on "Some of the Aspects of Research in Soil Deficiency," and short talks were given by D. France and T. Pagan (club members).

Southburn—Lyalldale. — Address by Mr. C. Marshall, Timaru, on "Seeds." At a previous meeting some interesting sound films were exhibited by Mr. C. C. Leitch, Department of Agriculture. Officers elected at the annual meeting:—Club Chairman, M. Toohey: Secretary, K. Caird; Treasurer, E. Moyle.

Waihaorunga.—Committee's recommendations, re lectures, field days, suppers, business meetings, debates, etc., were adopted. Mr. G. Barclay reappointed sole selector for debating teams. Address by Mr J. C. Hay, Morven, on "Essential Points to Consider in Buying a Farm."

Mid-Canterbury.

Hinds.—Annual meeting. Officers elected:—Advisory President, Mr. L. Chisnal; Club Chairman, E. Rhodes; Secretary, W. Keeley; Treasurer, L. Watson.

Mayfield.—Annual meeting. Officers elected:—Advisory President, Mr. J. Kingan; Club Chairman, K. Moore; Secretary, F. R. Morrow; Treasurer, I. Oakley.

Methven. — Lecture on "Artificial Insemination" by Mr. Sidey, Lincoln College. Officers elected at annual meeting:—Advisory President, Mr. R. J. Low; Club Chairman, C. Wightman; Secretary, T. A. Richards; Treasurer, R. Wightman.

Christchurch.

Darfield. — Discussion re billeting of other club members during judging competition. Lecture by Dr. M. C. Franklin, Lincoln College, on the "Dry-Feeding of Flock Sheep During the Winter Months."

Dunsandel. — Discussion re radio lecturette. Talk by Mr. L. W. Blackmore, Department of Agriculture, on the "Experimental Work of the Department."

Ellesmere.—Arrangements for 3YA broadcast. Talk by Col. J. Stafford on the "Feeding of Breeding Stock in Winter."

Springston.—Lecture on "Pigs" by Mr. H. McIntosh, of the Pig Marketing Association; the speaker dealt with the breeding, etc., and emphasised the importance of shelter and feed for sows. At the previous meeting Mr. McLean, Veterinarian, Lincoln College, conducted a post-mortem examination of a sheep.

Teddington.—Selection of a team to represent club at Tai Tapu Dog Trials. Lecture by Mr. C. W. Millar on "Pig Management," followed by a demonstration of castrating. Officers elected at the annual meeting:—Advisory Members, Messrs. G. O. Templeton and W. E. Wille; Club Chairman, A. H. C. Nutt; Secretary and Treasurer, P. A. de Pass.

West Melton.—Appointment of auditor. Discussion re field day. An interesting exhibition of "movie" films was given by Mr. F. Bull, showing activities on his own farm at Waddington.

North Canterbury.

Hawarden. — Lecture by Mr. A. S. Nash, Department of Agriculture, on "Artificial Manures." The meeting was attended by members of the Farmers' Union and also High School boys. Officers elected at the annual meeting:—Advisory President, Mr. J. Inkson; Advisory Members, Messrs. R. B. Kellock and J. W. Earl; Club Chairman, J. Blakely, A. B. Dalzell; Treasurer, R. Mason.

Oxford.—Lecture by Mr. A. S. Nash, Department of Agriculture, on "Manuring of Pastures." At a previous meeting Mr. Nash gave a lantern lecture on "Lime."

Scargill-Omihi.—Final arrangements for tour. Winners in various events at the dog trials were congratulated. Lantern lecture by Mr. A. S. Nash, Department of Agriculture, on "Lime."

Nelson.

Dovedale.—Business meeting. Welcome to new advisory president.

Moutere.—Members who took part in the recent tour of Otago and Southland gave talks on their impressions of the trip.

Marlborough.

Flaxbourne.—Discussion on projected Y.F.C. parade at forthcoming Blenheim A. and P. Show. Impromptu speeches by members.

Seddon.—Arrangements for annual dance. Talk by Mr. C. P. Gaisford, describing his trip to England.

Wairarapa.

Ballance.—Lecture by Mr. H. Cotter, Ngaturi, on "Hill-Country Management."

Carterton.—Arrangements for annual ball. Two club debates held, the subjects being: (a) "That Increased Mechanisation of Farms is in the Best Interests of the Country," won by the affirmative; and (b) "That Speed is Becoming the Master of Man Instead of Man the Master of Speed," won by the Negative.

Eketahuna.—Arrangements for a debate with the Alfredton Club.

Featherston.—Debate with Greytown Club:—Speakers, V. Gates, A. Saywell and D. Gordon (Greytown); W. Nix, R. T. Pillar and M. Benton (Featherston). The Featherston team were declared the winners.

Greytown.—Selection of team to debate with Featherston Club. Preliminary debate held on the subject ',That the Young Farmer of To-day Has Greater Opportunities Than Had His Grandfather in His Youth." At the previous meeting stock-judging teams were selected and a club debate held, the subject being: "Cheese Factory v. Creamery Supply."

Martinborough.—Short talks by members on their farming experiences.

Masterton.—Exhibition of films dealing with Caterpillar tractors. Arrangements re South Island tour, etc.

Manawatu.

Apiti.—Talk by E. Kearny and R. Galyer on their experiences at the recent Hastings educational week. At the previous meeting an address was given by Mr. John Kilgour on "Practical Forestry"; the speaker stressed the advantage of well-planned shelter belts, and pointed out the importance of the forest in conserving rainfall.

Bunnythorpe. — Arrangements for welcoming the Otago-Southland Y.F.C. touring party. Annual dance finalised. "Questions and Answers" evening; members came with questions prepared, and these were answered by Mr. E. E. Elphick, Government Veterinarian. At the previous meeting Mr. Kenneth Krammes, an American geologist employed by an American oil company at present conducting a geological survey in the Dominion, spoke on "Geology as Applied to the Search for Oil"; the address created great interest and keen discussion followed.

Colyton.—Report by delegates to Manawatu district meeting. Discussion on programme for winter months. Mr. E. E. Elphick, Government Veterinarian attended the meeting, and invited questions on veterinary problems. Members responded well, and keen discussions followed Mr. Elphick's replies.

Feilding.—Programme drawn up for ensuing six months. Arrangements for dance. Team selected to meet Halcombe Club in the first elimination contest of the North Island debating championship. Club debate, the subject being "That the Friesian is a Better Dairy Cow Than the Jersey"; a very keen contest took place, the debate being won by the affirmative.

Fitzherbert.—Business meeting. Discussion re debating contests, tour of South Island, etc.

Halcombe.—Discussion re debating, etc. Films exhibited by Mr. H. de O. Chamberlain, Department of Agriculture, dealing with the "Wheat Industry" and the "Germination of Seeds."

Kairanga.—Films exhibited by Mr. H. de O. Chamberlain, Department of Agriculture.

Kimbolton-Kiwitea.—Arrangements for musical evening. Report by delegates on annual district meeting. Lecture on "Geology and Its Relationship to the Search for Oil," by Mr. Kenneth Krammes, of the American oil survey party.

Levin.—Arrangements for dance, and also a debate. Lecture by Mr. A. W. Hudson, Massey College, on "Fertilisers and Topdressing."

Otaki-Te Horo. — Annual meeting. Officers elected:—Advisory President, Mr. C. C. Holmes; Club Chairman, E. K. Gawler; Secretary, F. Elliott; Treasurer, R. W. Hillas.

Paraparaumu. — Annual meeting. Officers elected:—Advisory President, Mr. W. R. Maclean; Club Chairman, D. Corner; Secretary and Treasurer, W. Hardham.

Pohangina Valley.—Business meeting. Report by delegates on annual district meeting.

Rangiotu.—Address by Mr. J. B. Chrystall, Kairanga Club, on "How to Conduct a Meeting"; great interest was taken and many questions asked the speaker. At the annual meeting held previously the following officers were elected:—Advisory President, Mr. W. H. Gimblett; Club Chairman, H. Lucas; Secretary and Treasurer, I. Bond. The District Secretary (Mr. H. de O. Chamberlain, Department of Agriculture), made some constructive suggestions on how to improve the club. During the month cricket matches were played with the Rongotea and Oroua Downs Clubs respectively.

Rongotea.—Election of football committee. Films on "Animal Husbandry" exhibited by Messrs. Pierson and Nelson. At the previous meeting details of the arrangements for a trip to the Mangahao Power Station were discussed, and a debating team was selected.

Shannon.—Letter of appreciation to be sent to Mr. C. H. Spiers for his generosity in donating the prizes for the Y.F.C. horse-judging competition held at the recent Shannon sports. Films exhibited by Messrs. Chamberlain and Holden of the Department of Agriculture, "The Wheat Industry," "Seed Germination" and "The Life Cycle of a Plant."

Tokomaru.—Arrangements for dance. Addresses by Mr. J. Holden, Department of Agriculture, and Mr. Robertson, on "Sheep Stations in the South Island" and "Sheep Farming" respectively.

Waituna.—Talk by Mr. H. Richardson on "The Farmers' Union." At the previous meeting a general discussion took place on "Romney and Southdown Sheep." A field day was held on Mr. Small's property, demonstrations on Romney and Southdown sheep being given by Mr. Small and Mr. P. Simpson respectively. There was a total attendance of approximately 30, including about 10 older farmers.

Whakarongo.—Arrangements for ball; invitations extended to the members of the Otago-Southland Y.F.C. touring party. Decided to have speeches at each meeting by two club members, to be not less than three minutes nor more than 10 minutes. Address by Mr. R. G. Scott on "Farm Management."

Woodville.—Arrangements for dance. Debate, Whakarongo v. Woodville on the subject "That Disease Control is of Greater Economic Importance Than the Breeding of High Producing Strains of Stock." The debate was won by the Woodville team. A successful field day was held on the Woodville Racecourse, demonstrations including "Crossbred Sheep" (Mr. M. A. McLeod); "Electric Fence" (Messrs. Abraham and Williams); "Farm Horse" (Mr. N. Blatchford); "Pigs" (Mr. E. P. Neilson); and "Mole Draining" (Mr. Hudson). There was an attendance of more than 70.

Wanganui.

Bulls. — Team to be entered in the North Island Debating Contest. Lecture by Mr. S. S. Timbs on "The Selection of Beef for Export."

Mangaweka.—Arrangements finalised for dance. Discussion re programme for future, etc. Lecture by Mr. Hill-Motion, Veterinarian, on "Animal Diseases." A field day was held on Mr. L. E. Weston's property, Ohingaiti; Mr. A. Wheeler, Hunterville, gave a demonstration on flock Romneys, and Mr. A. R. Dingwall, Department of Agriculture, gave a talk and demonstration on the experimental plots. There was an attendance of 45, including a number of older farmers.

Marton. — Arrangements finalised for annual dance. Talks on various subjects to be given by club members at the June meeting. Talk on "Pig Management" given by Mr. J. Aldworth.

Westmere. — Arrangements for a combined social and dance with the Farmers' Union. A party of members to go to Wanganui to meet the Otago-Southland Y.F.C. touring party. Mr. C. Smith spoke on "The Correct Procedure When Conducting a Meeting; the Rules of Debates and the Method of Preparing and Delivering a Public Address."

South Taranaki.

Alton.—Arrangements for a field day at the Waimate West Demonstration Farm and Mr. S. Morgan's farm at Mangatoki. Lecture on "Afforestation" by Mr. A. Taylor. The field day was duly held and proved a great success; a detailed account will be given in next month's notes.

Eltham.—Donation of 10/- voted towards the expenses of the South Taranaki party touring Australia. Arrangements for a field day on Mr. Blyde's farm. Address on "Cheese Making" by Mr. Thomas, a chemist at the Rennet Co.'s Laboratory. A successful field day was held at the Eltham Rennet Co.'s Factory and J. C. Hutton's Bacon Factory, there being a total attendance of 26.

Hawera.—Short speeches by various members were given to assist in the selection of the debating team to represent South Taranaki in the North Island contest. The advisory president, Mr. P. O. Veale, gave constructive criticism on the efforts of each speaker. At the previous meeting Mr. J. E. Davies, Department of Agriculture, led a discussion on "Co-operative Farming."

Kaponga. — Address by Mr. J. E. Davies, Department of Agriculture, on "Pastures and Their Management." At a previous meeting arrangements were made for a fifteen-a-side Rugby match against Pukengahu Y.F.C.; also for two teams to compete in the ten-a-side tournament at Eltham in July. Arrangements were also made for a dance in the Town Hall.

Pukengahu.—Discussion on forthcoming football tournament. Address by the Rev. G. W. Bird : "Life in the Royal Air Force."

Whakamara-Mokoia. — Decided to institute table tennis evenings during the winter months. Club debate, "Sheep-Farming v. Dairy-Farming"; the supporters of dairy-farming were declared the winners.

North Taranaki.

Hillsborough-Tarurutangi.—Club debate, "That the Future of New Zealand Farming Depends Upon Compulsory Unionism." Speakers: N. Sampson, R. Meharry, P. Locke, L. Copestake, B. Sinclair (affirmative); R. Anderson, E. Anderson, N. Warren, D. Marsh, E. Dixon (negative). The debate was won by the affirmative. At the previous meeting arrangements were made for a dance to entertain the Otago-Southland touring party. Club members who recently who recently went on a tour of the West Coast of the South Island gave their impressions of the trip.

Inglewood.—Discussion and talks by various members regarding water supplies on their farms. A talk on "Native Bird Life" was given by F. Bracegirdle, a club member.

Karawaka.—Report on club dance and euchre party. Arrangements for a debate v. Hillsborough-Tarurutangi Club. Invitation accepted to inspect Mr. Turnbull's plantations at Huirangi. Address by Mr. W. Hall, Huirangi, on "Environment and Cross-Breeding of Livestock." A party of 20 club members made an evening visit to the Taranaki Service Laboratories, being conducted through by Mr. P. O. Veale. A field day was held, the party first visiting Mr. C. B. Lepper's property at Lepperton, where Mr. D. O'Sullivan, Inglewood, demonstrated on a pedigree Jersey cow, after which members judged four cows. B. Brooking, G. R. Franklin and L. Oliver placed the animals nearest to the judge's selection. After lunch members visited Mr. A. G. Hall's property at Huirangi, where Mr. Hall demonstrated on a pedigree Ayrshire cow; a judging competition was held, the winners being K. Lattimer and A. Shrider. The party then proceeded to Mr. L. A. Alexander's property at Tikorangi, where the owner addressed members on the correct type of a bacon pig, after which the concrete silos were inspected.

Mangamahoe.—Arrangements for a dance to to be held at Egmont Village, The programme for the year was considered, mention being made of pig-breeding and stack-building competitions; reciprocal and round tours were also discussed. Talks were given by three members who had undertaken the recent Y.F.C. tour in the North Island.

Mangorei.—Mr. Kristensen, Dairy Instructor, gave an interesting talk on his work, and related some of his experiences in different localities.

Okau-Tongaporutu.—A field day was held on Mr. J. N. Blyde's property, Lepperton, addresses and demonstrations being given by Mr. Blyde, and Messrs. A. G. Elliott and G. A. Blake, Department of Agriculture. A party of members also visited the fertiliser works, Smart Road, where they were shown the various stages and processes in the manufacture of superphosphate.

Rahotu.—Discussion re the educational week at Wanganui. Address on "Pig Husbandry" by Mr. G. A. Blake, Department of Agriculture.

Toko. — Discussion re field day and dance. Debate arranged for next meeting. Talks were given by W. Needham, C. C. Rowe and John Lister, members who had taken part in the recent Y.F.C. tour of the North Island.

Southern Hawke's Bay.

Onga Onga.—Lecture by Mr. A. D. M. G. Laing, Government Veterinarian, on "The Care of Pregnant Ewes" and "Hogget Troubles."

Takapau.—Business meeting. Arrangements for a field day, etc.

Northern Hawke's Bay.

Nuhaka.—Annual meeting. Officers elected:—Advisory President, Mr. G. D. Tod; Club Chairman, G. Whitmore; Secretary and Treasurer, N. J. Alexander.

Wairoa.—Annual meeting. Officers elected:—Advisory President, Mr. A. C. de Latour; Club Chairman, D. G. Wilson; Secretary, W. G. Brownlie; Treasurer, W. T. Powdrell.

Poverty Bay.

Gisborne. — Mr. G. D. Briant gave a brief criticism of the speakers at the annual meeting. Address by Mr. D. Cameron on "The Water Problem in Australia." Officers elected at the annual meeting:—Advisory President, Mr. G. D. Briant; Club Chairman, G. W. Smith; Secretary, L. Munro; Treasurer, R. Kerr.

Te Karaka.—Annual meeting. Officers elected:—Advisory President, Mr. C. Bull; Club Chairman, J. Dymock; Secretary, J. H. Bayley; Treasurer, A. D. N. Manuel. At a previous meeting Mr. Sears gave a talk on "How to Identify Grasses."

Taumarunui.

Ohura.—Inaugural meeting. Officers elected:—Advisory President, Mr. N. Dougherty; Club Chairman, I. McKenzie; Secretary, C. Ryan; Treasurer, J. Dougherty. Mr. J. M. Hopkins, Department of Agriculture, outlined the work of the Clubs and the aims and objects of the organisation.

Taumarunui. — Business meeting. Arrangements for exhibits at Waikato Show. Election of delegates for council meeting at Hamilton.

Te Kuiti.

Aria.—Discussion re Y.F.C. Rally at Ruakura and short courses at Massey College. Films exhibited by Mr. H. Woodyear-Smith (a) "Soil Erosion," (b) " Phosphate Works," (c) "Dairy Factories in the Dominion."

Otorohanga.—Arrangements for ball. Discussion re club programme for winter months. Selection of teams for debating contests. A field day was held on Mr. A. J. McCready's farm, taking the form of a talk and demonstration by Mr. Harrington, District Superintendent of Pig Clubs, on "Correct Types of Bacon Pig for Export," and an address on "Recent Grassland Research" by Dr. Annett. At the annual meeting the following officers were elected:—Advisory President, Mr. S. K. Tipping; Club Chairman, R. Palmer; Secretary, C. G. Murphy, Jnr.; Treasurer, H. C. Murphy.

Te Anga Central.—Films exhibited by Mr. H. Woodyear-Smith, on "Soil Erosion," "Manufacture of Superphosphate" and "Sulphur Workings in Texas." Mr. K. M. Montgomery, Department of Agriculture, also addressed the meeting. The following officers were elected at the annual meeting:—Advisory President, Mr. A. Burt; Club Chairman, H. Wright; Secretary, H. O. Goddard; Treasurer, N. Stokes.

Eastern Bay of Plenty.

Opotiki.—Arrangements for Y.F.C. Courts at Waikato Winter Show; discussion re short courses at Massey College. Short talks by members: "Lucerne on Rolling Country" (J. Beattie); "Ploughing" (W. Armstrong); "Scarifying Maize and Swedes" (T. Clark); "Farming Conditions in India" (R. Stuart); "Poultry Keeping" (D. and G. Bennett).

Taneatua. — Details of Y.F.C. Courts at Waikato Winter Show. Arrangements for dance.

Waimana. — Discussion re Y.F.C. Courts at Waikato Winter Show. Suggestions re programme of meetings. Tour of North Auckland. Arrangements for debate with Edgecombe Club.

Western Bay of Plenty.

Omokoroa —Business meeting. Discussion re sports meeting.

Paengaroa.—Committee set up in connection with exhibits for District Court at Waikato Winter Show. Arrangements for final debate between Eastern and Western Bay of Plenty Clubs. Lecture by Mr. I. Vercoe, "Experiences of Pioneering Days in the District."

Tauranga.—Arrangements for a dance in the Town Hall to entertain members of the North Auckland Y.F.C. touring party in July. Ping-pong table to be purchased. Competition arranged with the Omokoroa Club for the two best five-minute prepared speeches. Mr. Strugnell (advisory president) donated as prizes the cost of two short courses at Ruakura. Lecture by Mr. A. V. A'lo, Department of Agriculture, on "Farming in Canterbury."

Rotorua.

Horo Horo.—Business meeting. Details of tour of East Coast. Consideration of programme for ensuing year; field day arranged, etc.

Putaruru. — Discussion re Y.F.C. Courts at Waikato Winter Show; also arrangements for debates, etc. Lantern lecture by Mr. C. S. Dalgleish, Department of Agriculture, on "The Effects of Lime on Some New Zealand Soils."

Rotorua-Ngongotaha. — Club debate, "The Keeping of Pigs in Styes v. the Keeping of Pigs in Small Runs." Speakers: A. E. Armer, A. L. Lewis, J. Martin, E. Hunt (styes); J. Crisp, A. McHale, W. Dittmer, H. Dittmer (small runs). The debate was won by the advocates of styes. At the conclusion Mr. T. A. Turner gave a short address on his experiences with both systems. At the previous meeting films on agricultural subjects were exhibited by Mr. C. Walker, Department of Agriculture, and at a more recent meeting Mr. C. S. Dalgliesh gave a lantern lecture on "The Effects of Lime on Some New Zealand Soils."

Waikato.

Hunt'y West.—Discussions re purchase of wrestling mat, and proposed visit to Ruakura Farm and Horotiu freezing works. Arrangements for debate. A visit was made to the Franklin box and butter factories.

Kakepuko.—Club debate: "That the Tractor is Superior to the Horse for Farm Work. Speakers: J. Litchwark, P. Smith, G. Langdale, J. Gray (tractor); P. Ray, E. Hopping, D. McLeary, P. McVerry (horse). The decision was given to the supporters of the horse, with 340 points against 308. At the conclusion an address on "Debating" was given by Mr. A. R. Hill.

Tahuna. — Ping-pong table to be made; a Badminton club formed. Arrangements for a social and dance.

Te Kowhai.—Business meeting followed by a social. Arrangements for a visit to Auckland.

Members of the Kaitaia District Committee: *Back row.*—Messrs. B. Rogers, W. A. Beattie, J. C. Marsh, R. D. Hanlon, Jas. MacKenzie, V. Beasley, H. Proctor, R. Hawkins, R. Beasley, H. Frew. *Front row.*—Messrs. T. Flinn, H. Hooper, E. H. Hansen (chairman), A. M. Lee (secretary), O. F. Packard, A. Harrison.

Auckland.

Franklin.—Lantern lecture by Mr. H. Woodyear Smith on "Soil Husbandry" and "Dairy Factories." Arrangements for dance. Debate to be held at next meeting.

Mangatawhiri.—Discussion re winter activities; decided to proceed with gymnasium, to be held every Monday night for three months. Library rules to be enforced. Arrangements for a dance; a "Burlesque Ball" to be held in the evening on King's Birthday. Visit to be made to Harrisville with the hope of forming a club in the locality.

Warkworth.

Port Albert.—Lantern lecture by Mr. P. Syme, Department of Agriculture, on "The Breaking-in and Development of Pumice Land." At the previous meeting Mr. R. A. Whitmore, Wellsford gave an address on "How to Conduct a Meeting."

Wellsford.—Lantern lecture by Mr. P. Syme, Department of Agriculture, on "The Breaking-in and Development of Pumice Land."

Whangarei.

Matarau —Club debate: "That the Farmer of To-day is Better Off Than the Farmer of Fifty Years Ago." Speakers: H. W. Agnew, W. A. Rushworth, F. L. Thorburn (affirmative); I. D. Bodle, T. Brown, R. Martin and R. Cossil (negative). Mr. E. B. Glanville, Department of Agriculture, acted as judge, and gave his decision in favour of the negative; at the conclusion he gave the speakers some helpful advice. At a previous meeting Mr. Glanville gave a lantern lecture on the "Bringing-in of Gum Land." A visit by club members, accompanied by a number of older farmers, was made to the Moerewa freezing works, the main interest being the slaughtering and judging of pigs from the Whangarei Show in connection with the National Bacon Championship. Special attention was paid to the four pigs used for the Y.F.C. judging competition. The party numbered approximately 50. Members also attended the Whangarei dog trials, and were given a very interesting and practical lecture on "Trial Dogs" by Mr. H. B. Sloane.

Maungakaramea.—Arrangements for delegates to attend the council meeting. Mr. D. S. Ross, Chairman of the Auckland Y.F.C. Council, and Vice-President of the Federation, gave an address on "The Conduct of Meetings" and the Y.F.C. generally. Messrs. C. Walker, Department of Agriculture, and W. Alexander gave addresses on "Debating" and the "District Courts at the Waikato Winter Show" respectively.

Dargaville.

Ruwai.—Combined meeting with the Marohemo Club. Mr. D. S. Ross, Chairman of the Auckland Y.F.C. Council and Vice-President of the Y.F.C. Federation, gave an address on "Procedure at Meetings," and Mr. C. Walker, Department of Agriculture, Hon. Secretary to the Council, gave a talk on "Club Activities Generally," dealing, among other matters, with debating, radio lecturettes and the District Courts at the Waikato Winter Show. At the previous meeting Mr. T. Overton, engineer to the North Auckland Electric Power Board, gave an address on "The Progress of Electric Power on Farms."

Kaitaia.

Broadwood. — Lantern lecture by Mr. E. B. Glanville, Department of Agriculture, on the "Development of Gumland." At the previous meeting two debates were held: (1) "That a Sheep Farm Takes More Managerial Ability Than a Dairy Farm." A. Grounds and W. Grounds (affirmative) narrowly defeated R. Ling and R. McDonald (negative). (2) "That Breeding One's Stock is Preferable to Buying Them." J. McKenzie and D. Hawkins (affirmative), defeated T. Hick and J. Hick (negative).

Kaeo —Arrangements for billeting and entertaining the party of 20 visiting members from the Bay of Plenty clubs: Oruru and Kaeo Clubs to billet 10 each and combine with the entertainment. Exhibits for the District Court at the Waikato Winter Show, collected by the District Y.F.C. Secretary, Mr. A. M. Lee, Department of Agriculture.

Oruru.—Arrangements for billeting members of Bay of Plenty Y.F.C. touring party. Lantern lecture by Mr. E. B. Glanville, Department of Agriculture, on "The Consolidated Sand and Gumland Areas of the North."

Umawera. — Field day on the properties of Messrs. W. Postleweight and R. McLeod. Mr. W. A. Beattie, Supervisor, Northland Pig Council, lectured and demonstrated on pigs at both farms.

Health Notes for the Farm

Contributed by the Department of Health

Prevention of Tuberculosis

AS THE subject of this article is the prevention of tuberculosis, it might be opened by stating the well-known parallel which that great modern physician, Sir William Osler, drew between infection in tuberculosis and the parable of the sower as illustrating in an effective way the importance of the nature of the ground upon which the seeds of this disease fall.

"Some seeds fell by the wayside and the fowls of the air came and devoured them up."

These are the bacilli, or germs, broadcast outside the body. An immense majority of them die.

"Some fell upon stony places."

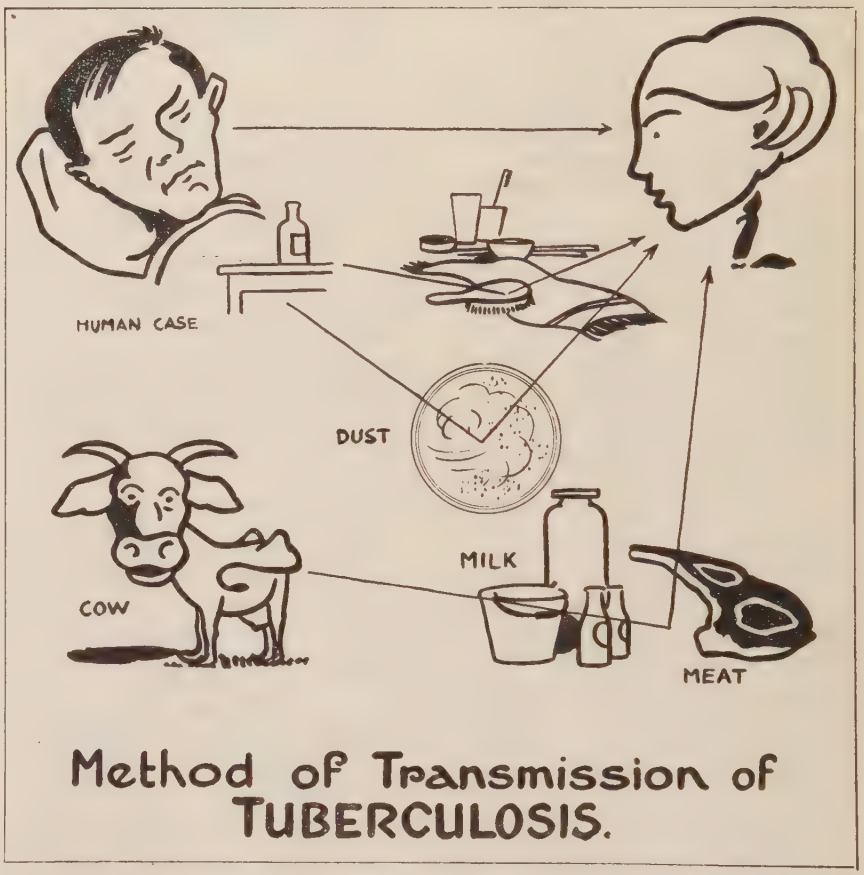
These are the bacilli, which find lodgment in many of us, perhaps with the production of a small focus, but nothing comes of it. They wither away because they have no root.

"Some fell among thorns, and the thorns sprang up and choked them."

This represents the cases of tuberculosis, latent or active, in which the seed finds the soil suitable and grows, but the conditions are not favourable, as the thorns representing the protecting forces of the body get the better in the struggle.

"But others fell on good ground and sprang up and bore fruit a hundredfold."

To this group belong the 589 who died from this disease in 1937 in New Zealand and many others who did not die but whose health was greatly damaged—the soil suitable, the protecting forces weak.



Method of Transmission of TUBERCULOSIS.

Susceptibility

Now the reader may ask what makes a "good soil" for tuberculosis. Surely, in the first place, it is an infant or child suffering from defective nutrition. Such children may in some instances come from an unsuitable environment, such as a home where there are unsanitary habits, bad and insufficient food, ill-ventilated rooms, or it may be the result of other causes as given in this article.

How are we to protect children from tuberculosis? For have we not reached an era when man, with his present-day medical knowledge and his reasoning therefrom, refuses to believe in the inevitability of this disease, with its disastrous consequences? The most convenient way to attack this aspect, and the most rational, is to follow out

the life of an individual from birth onwards—rational because it is a generally accepted fact that it is in the child, just as in the "virgin soil," such as native races, that the disease meets with little resistance to its onslaughts.

If the young child comes into contact with the sufficient germs in numbers and potency it either succumbs, develops active tubercle (for the most part either of its bones, joints, or glands), or it grows up with an infection tucked away, or latent, ready to spring into activity at a later stage of life. The child may appear perfectly healthy until a certain age or may exhibit a delicacy of constitution, mostly the latter. In ordinary circumstances and surroundings, and without contact with concentrated infection, such as occurs in people with active lesions, or without being fed on food infected with tubercle, a child becomes gradually exposed to small doses of infection of the tubercle bacillus, to which, in the great majority of cases, it reacts successfully.

Hygienic Principles

This result is more likely to be obtained if the child is reared in accordance with certain hygienic principles. Such general principles are fairly well known, and merit reiteration. For instance, we know that all growing life requires for its growth and maintenance suitable food in sufficient quantity. Any failure to maintain this means a weakening and stunting of the body. Taking the infant naturally fed, in normal circumstances the maternal milk supplies all the requisite nourishment for the first nine months.

At this stage the nearer its food approaches the human standard the more adequate it is, and, moreover, it is supposed that a certain immunity to disease is transmitted from the mother to child, the former having previously gained her immunity. Hence the desirability of such feeding. As a rule, the history of natural feeding is associated with an extra degree of resistance. In the words of a French proverb, "Nothing can take the place of the milk and heart of a mother."

Choice of Food

Food for children should be simple, nutritious, and well cooked, and should include suitable bread, butter, fresh vegetables, fruit, a little fresh cooked meats, and a liberal supply of pasteurised milk daily, or milk from an assured tested source, in order to guard against bovine tuberculosis, which affects the bones, joints, and glands. The doctor may recommend cod-liver oil.

The Plunket Society nurses give sound and reliable information and commonsense advice as to the feeding of the very young, and their advice should be sought accordingly by mothers. Better nutrition and increased knowledge of the bringing up of children play an important part in the conquest of this disease.

In the young child, as in all children, clothing as a means of regulating bodily heat must be studied, as must also all open-air and other hygienic measures. The sleeping quarters of a child must be so arranged as to give fullest benefit from fresh air. Delicate children, and indeed all children, gain in vigour and health from sleeping out of doors, such as on a sleeping balcony or verandah arranged to give adequate protection from stress of weather.

Importance of Rest

The child must have adequate rest. Dr. Blackmore, late superintendent of Cashmere Hills Sanatorium, Christchurch, once stated, "I am convinced that at the present day very many children have their resistance to tuberculosis broken down through not getting sufficient rest in the twenty-four hours." Children under ten years of age should sleep twelve hours, those under thirteen should sleep eleven hours, and those over thirteen at least ten to eleven hours. Children, especially if of the slightly highly strung type, should be encouraged to lie down for an hour on their return from school, and for little children a morning rest is desirable as well.

Indulgence even in such an excellent thing as sports must be reasonable and not excessive. Weigh the child regularly, and see that it gains weight satisfactorily. If this is not so, medical advice should be obtained. After any illness, such as measles, influenza, or any operation, see that recovery is complete before the child returns to school.

As the child grows older it may exhibit characteristics of defective nutrition that mark it as what is called pretubercular. Such children constitute a type who deserve special consideration in upbringing. The best possible means of living are necessary, and for them health camps along the lines now in operation throughout the Dominion are advantageous both as a change and stimulus and from an educational point of view, for, as one writer says, "the cure must begin before the disease."

Early Symptoms

The most common early symptom of tuberculosis is possibly a slight cough which occurs usually, but not always, in the morning and which does not disappear with the ordinary treatment. Not infrequently, however, before there is any cough other symptoms may appear which should warn one of the possible danger of tuberculosis. One of the most suspicious of these is an unusual sense of fatigue and weariness coming on without any good reason. Persistent fatigue and weariness may be a suspicious symptom. Long and continued hoarseness which is not relieved by the usual treatment is very suspicious. A steady and unaccountable loss of weight is another important symptom which should warn one of possible tuberculosis. A very early symptom is loss of appetite with indigestion.

Frequently the disease first shows its presence with a slight spitting of blood, which may not be followed for a long time by any other suspicious symptoms. Unusual sweating at night may at times be the first indication of the disease, although this symptom is ordinarily preceded by others. A persistent pain in the chest, especially in the region of the shoulder, should always be carefully investigated, as the first evidence of a tuberculous pleurisy often begins at the top of the lung.

Any or all of the symptoms described are suspicious. The trouble may not be tuberculosis, but it pays to be sure, so it is wise to go to a doctor and let him decide what is wrong. In the large majority of cases tuberculosis can be arrested or cured provided it is recognised early, but if it is not discovered until the disease is advanced the chance of curing is greatly lessened.

As soon as a person is recognised to be suffering from tuberculosis he should make every effort possible to go into a sanatorium if recommended by his medical adviser. At a sanatorium he will not only get the advantages of excellent climatic conditions, but, what is even more important, constant medical supervision and careful instruction and training by specialists and nurses in how to conduct his future life at home.

Prevention

With reference to the problem of the prevention of tuberculosis generally, as a child approaches adolescence an extra strain is experienced, and it is very necessary that the mode of life be regulated. We naturally consider in this connection the feasibility of outdoor occupations, which undoubtedly offer the advantages of sunlight and fresh air. Unfortunately, for girls at least, this field is limited, and does not offer much inducement. Indoor life of a more or less strenuous nature claims the majority.

We do not hear so much today, even in novels, of the love-lorn heroine dying of decline, but we do find tired office and shop people, the tired child-bearing mother, and many others who are feeling the strain of life under conditions which are so often far from ideal, and who are therefore liable to fall an easy prey to tuberculosis.

Sir Robert Philip, the eminent international authority on tuberculosis, said in one of his lectures: "Sitting the other day at a high ceremony in one of our great public schools, I was immensely impressed with the absence of bloom of health that ought to prevail in such a nursery of developing men. On remarking it to my neighbour, a very intelligent lady, she said, 'Yes, how is it the young boys look so pale?' They were like hot-house plants with insufficient chlorophyll. They lacked freshness of plants grown in the open."

It is therefore very important that young people, to prevent consumption, should seek fresh air, sunshine, light, clean rooms, well-chosen food, ample sleep, exercise in the open air, and should avoid breathing foul air, long hours indoors, dark, dirty rooms, careless eating, chronic fatigue, lack of exercise, neglected decaying teeth, dust and smoke, dissipation and worry.

Letter to Editor

Quality of British Worsteds

THE FOLLOWING letter has been received from Mr. W. A. Wells, News Editor of the Empire Industries Association:—

"There has recently come into my hands an extract from your issue of the 20th February, 1939, in which the following words occur:—

> "'For some time past British manufacturers have been including, roughly, 25 per cent. of a synthetic material called "fibro" in the manufacture of worsteds which are marketed as pure wool.'

"Though I am not an expert on the subject of wool, this statement appeared to me to be so remarkable that I instituted enquiries and I would ask you to be good enough to take my assurance that it is quite untrue. It is probable that the misunderstanding has arisen from the fact that reports have reached New Zealand of certain experimental work which has been done in the United Kingdom on the use of fibro in admixture with wool in certain fabrics. As far as I can ascertain there has been no export of such fabrics from the United Kingdom, and, in any case, British exporters would not describe such fabrics as 'all wool.'

"It is known that mixture fabrics of foreign manufacture have reached New Zealand in small quantities and, while it is possible attempts have been made to market these as 'all wool,' the exports of British manufactures should not be confused with those of foreign manufacture. It is, of course, customary to state the composition of such fabrics on the invoice and New Zealand is understood to be keeping a close watch on the importation of mixture fabrics of this kind and the British industry naturally hopes that they will introduce legislation whereby the word 'wool' can be protected as applied to goods imported and/or exposed for sale.

"May I add that I trust publicity will be given to this disclaimer because a statement of the kind which appeared in your publication may well be calculated to undermine the confidence which is so essential to promoters of Imperial trade."

Error Regretted

The following comment on the above letter has been received from Mr. L. J. Schmidt, Secretary of the Department of Industries and Commerce, Tourist and Publicity:—

"It is sincerely regretted that the particular paragraph referred to by the Empire Industries Association was unfortunately so loosely worded. It certainly conveys a meaning which, you may rest perfectly assured, was not intended by the Department.

"The writer of the article has produced authorities for the statement that synthetic fibres have been included in worsteds, some of which have come to New Zealand, but in saying that these have been sold as pure wool he explains that he was referring to distributors who sold articles of clothing made from these fabrics and not to the manufacturers of the textiles.

"The temperate and friendly tone of the letter from the Association drawing attention to the paragraph in the article is graciously acknowledged and our apologies are tendered herein for the error.

"It is suggested that in order to compensate for the mistake, you offer to publish the letter from Mr. Wells and this explanation from the Department of Industries and Commerce."

The Farm Home and Kitchen

Contributed by the Association for Country Education

Don't Waste Storage Space

"A PLACE for everything, and everything in its place"—what a picture of perfection for the so-busy homemaker! But how difficult of attainment when one lives in a house singularly destitute of cupboards, especially when it comes to storing away china, pots and pans, and kitchen supplies!

Fortunately, however, it isn't as hard as you think, for there **is** a way of making **new space in old cupboards,** a way of almost doubling their capacity, and, what is more, a way of doing it **yourself** for a few pence.

Cupboards.

Look at the cupboards in your kitchen.

Have you ever noticed just how much wasted "up and down" space there is? The shelves are so far apart that, although there is not an inch of space **on** them, there is a great deal of emptiness **in between.** Especially is this true when small things such as spices, cups, and saucers are stored. Even when the shelves are full there is a great deal of space above the supplies, space which can be used to good advantage, as you will see from the picture on this page.

A space-saving arrangement of cups, plates, dishes and glasses.

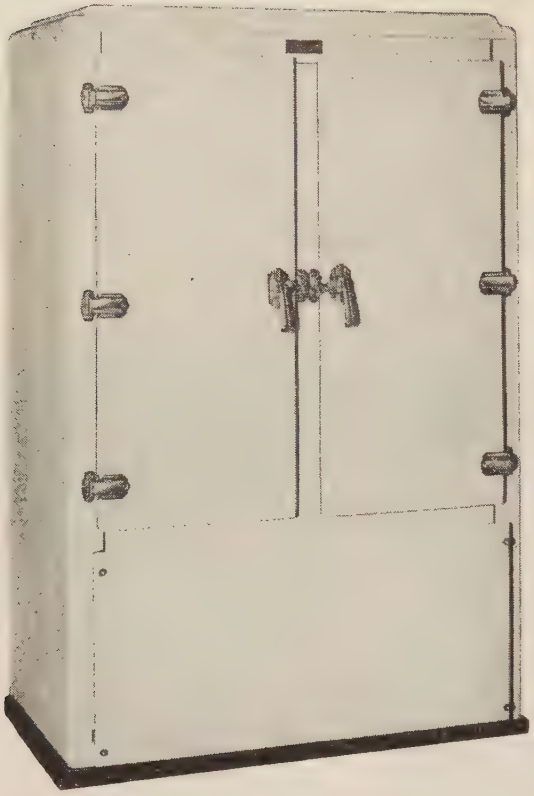
How baking dishes and basins may be stored without wasting space.

This picture shows the secret of "making new space in old cupboards." It consists simply of making small, extra shelves which sit on top of the shelves already in your cupboards. The idea is to make them just high enough and wide enough so that things can be placed on top of as well as underneath them.

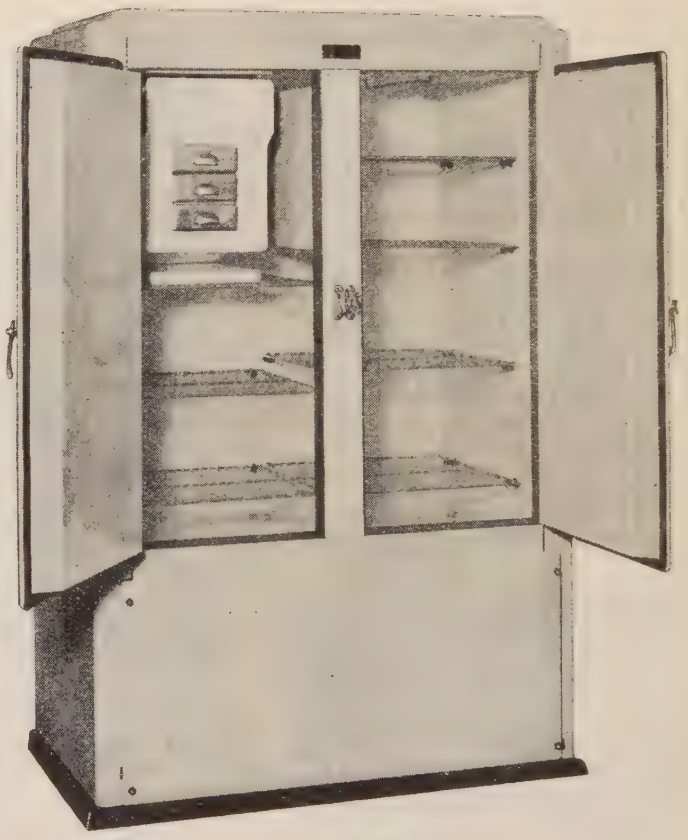
For instance, for a china cupboard, a shelf 7in wide, 6in high, and as long as the length of the cupboard will hold cups, saucers, bread and butter plates on top, while underneath it is plenty of room for dinner plates, dessert plates, soup bowls, and glasses.

For the supply cupboard, a shelf wide enough for tins of spices and bottles of essences, and high enough so that such things as tins of baking powder and packets of cornflour can be set below it, will easily double its capacity—as well as adding to its orderliness.

1939 FRIGIDAIRE



This special model for farmers has 18 cubic feet of space . . . will accommodate a whole sheep . . . and is fitted with a meat rail.



★ Here is a real Refrigerator for farmers. Not merely an enlarged "household" model but a specially designed commercial unit which willl provide perfect refrigeration under all conditions.

It has a Heavy Duty Cooling Coil—and will give 72 big Ice cubes at one freezing.

The cabinet is constructed of silver-finish steel, coated with a beautifully finished nigh temperature baked Dulux.

Seven shelves provide abundant storage area for the requirements of the biggest farm home. Meat may be hung or jointed and placed on shelves.

FRIGIDAIRE gives you a low operating cost, low upkeep and a long life of trouble-free refrigeration backed by General Motors' guarantee.

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Doors Useful.

If cupboards have swing and not sliding doors, small wooden racks, or shelves, if you like, can be fitted on the inside of the doors and used for spice, tins, and small bottles, or even glasses.

For the cupboard where you keep your various baking and roasting pans, a few slats of thin ply wood will increase not only its space, but also its convenience.

Place the slats so that your cupboard becomes a sort of filing case for your pans where they can be kept standing on end instead of being inconveniently stacked on top of one another. You will probably find, too, that when you do this there will be ample room for an extra shelf **above** the pans, on which can be kept such things as trays or chopping boards.

Wardrobes, Too.

But the farm kitchen is not the only place where we can increase our storage space. Much the same idea can be carried out in the wardrobes and in dresser drawers.

A broom handle, fitted so that it runs lengthwise in the wardrobe, makes an excellent rod on which to hang coat-hangers for your frocks, coats, and suits, and it will more than double the capacity. A shelf above this rod for shoes and hats can also make the world of difference, with maybe a small "extra" shelf (like those in the kitchen cupboards) to increase the capacity still further.

Dresser drawers, too, can be vastly improved if small cardboard boxes are used for dividing them into compartments for handkerchiefs, gloves, stockings, undergarments, and so forth. If you haven't any boxes, just plain cardboard cut to fit the width of the drawers will do equally well.

This article was adapted from "Farmer's Wife" Magazine.

O.K. for Hot Water!

Put a "Starkie" Water Heater behind the Hot taps in your home and enjoy the boon of a copious hot water supply for all requirements throughout the 24 hours of the day!

"Starkie" Heaters are made in capacities and types for every household, also for hotel and restaurant kitchens. They are backed by years of experience and thousands are in use throughout New Zealand.

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"Starkie" is the best-known word in the water heating realm of New Zealand. With a "Starkie" Electric Storage Heater on duty you have the most efficient hot water service. See your Power Authority. Full particulars of the various sizes and types may also be obtained from:—

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Three Rules For Efficient Storage

(1) *Things used together should be kept grouped together where they are used.*

For example, why not keep all your cleaning equipment in one "cleaning cupboard," rather than keeping the dust mop on the back verandah, the vacuum cleaner in the bathroom, and the broom in the kitchen!

(2) *Things most frequently used should be kept in the most convenient places.*

For instance, all things used for dish washing and those things which are used three times a day should certainly have a convenient place near the sink.

"Convenient placing" means that an article is so placed that one can get it and put it away without undue stooping, reaching, walking, or moving other articles out of the way.

(3) *Group the articles so that one particular kind of article can be taken from its storage place without necessitating the moving of other articles first.*

For example, it is quite possible to arrange the china cupboard so that you can set the table for a meal without moving small plates off the larger ones or without moving several cups before reaching the gravy boat. For the same reason it should be possible to take a pair of stockings from a dresser drawer without first having to move handkerchiefs, a pile of scarves, or a starched shirt.

Steaming Soups for Wintry Days

CHILL winter days call for the welcome warmth of steaming soups. Those with milk as a basis are not only delicious but also nutritious. The recipe follows:—

Cream of Vegetable Soup.

Make a thin white sauce, using the following proportions:—

Milk, 1 cup.
Flour, 1 tablespoon.
Butter, 1 tablespoon.

To this add vegetables which have been cooked, seasoned, and pressed through a sieve. The water in which the vegetables were cooked may be used in place of half the milk in making the white sauce. Serve hot.

Favourite vegetables for this kind of soup are:—Carrots, celery, artichoke, asparagus, onion, tomato, spinach, swede, pumpkin, and potato.

The next recipe is for a specially delicious French soup, using stale bread as the thickening agent instead of white sauce.

Onion Soup.

Onions, 6 medium-sized.
Stale bread or toast, 3 slices.
Butter or dripping, ¼ cup.
Salt, 1 teaspoon.
Milk, 1 pint.
Vegetable broth, 1 pint.

Cut up the onions into a saucepan which has a tightly-fitting cover. Add the butter or dripping and cover, sealed with a damp cloth to prevent evaporation. Cook slowly for one hour. Remove cover and add the vegetable broth, stale bread or toast, salt and pepper. Cover again and let cook for ¾ hour. Remove from fire when the onions and bread are well softened, and press the whole through a colander. Add one pint of milk or enough to bring the soup to the desired consistency. Heat again and serve with grated cheese, to be sprinkled over individual servings according to taste.

Chowders and stews are other welcome additions to the menu on June days.

Chowder.

Cut a few strips of bacon and fry, adding chopped onions and stirring until the onions are slightly brown. Add such vegetables as raw, diced carrots, turnips, beans, potatoes, etc., with sufficient hot water or milk to cover. When the vegetables are tender, add salt. Bring to simmering point. Place crackers or dry toast in the serving dishes and pour the chowder over. Serve at once.

Beef Stew.

Steak, 1 pound (blade, topside, flank, bolar, or chuck).
Flour, ¼ cup.
Salt, 1 teaspoon.
Pepper, 1-8 teaspoon.
Carrots, turnips, onions, potato, or any other vegetables in season.

Mix together the flour and seasonings. Dip the meat into this mixture and then brown thoroughly in a little fat. Cut in pieces and put into a saucepan with cold water and bring to simmering point. Brown the vegetables in the fat and add to the stew. Simmer two to three hours.

Kidney Stew.

Beef kidney, 1.
Water, 3 cups.
Onions, 2.
Bacon, 6 slices, diced.
Pepper, 1-6 teaspoon.
Salt, 2-3 teaspoon.
Flour, 2 tablespoons.
Mustard, 1 teaspoon.

Remove the skin from the kidney, cut into fairly small pieces, and place in a saucepan. Fry the onions and diced bacon and add these to the kidney. Mix the flour, seasonings, and water to a thin paste and add to the stew. Simmer slowly until the meat is tender.

Swiss Steak.

Lean beef steak, 3lb (topside, thick flank, or bolar, cut 2½ inches thick).

Flour, ½ cup.
Salt, 1½ teaspoons.
Pepper, 1-8 teaspoon.
Dripping, 3 tablespoons.
Tomato juice and pulp, 2½ cups.
Onion, 3 cups sliced and sauted.

Beat the seasoned flour into the meat and brown it in the dripping. Transfer to a casserole and cover with the tomato juice and pulp and the onion. Cover and bake at 350deg. F. for 2½ hours. At the end of the first hour place prepared carrots, potatoes, and whole onions in the corners of the casserole dish, recover, and continue cooking. This makes an excellent "one dish" meal.

A Simple Test for Fibres

(1) Pure silk burns to a small, crisp, black bead, and smells like hair.

(2) Silk "weighted" with tin, etc., burns on'y partially, the threads still holding their shape.

(3) Rayon burns with a flash, leaving an ash and a smell like that of burning paper. Celanese burns into a very hard substance.

(4) Wool burns into a black bead with a smell of burning hair or feathers.

(5) Cotton leaves a white ash, but the threads still hold their shape.

(6) Linen leaves a very little ash, which seems to disappear when touched.

The School Lunch Box

REMEMBER that the boy or girl who has to eat his or her lunch at school is just as much in need of a satisfying, well-balanced meal as is the one who is able to go home at noon. For this reason a substantial food, some fruit, and something nourishing to drink should be included in the school lunch box.

Sandwiches with a filling of egg and lettuce, cheese, nuts, dates, or meat will provide the substantial food. Fresh fruit in season, or figs, prunes, or dates, can easily be tucked in, while raw carrot strips are also good.

When no hot drink is served at school a small thermos bottle can easily be used to carry cocoa or hot soup.

Always remember that by the time a hastily wrapped parcel has bumped its way to school in the regular school-bag the lunch it contains will be rather a sorry-looking meal when noon-time comes. A simple cardboard box, and a few sheets of waxed paper in which to wrap the sandwiches, can make all the difference.

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SUBSCRIPTION RATES

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